

Large Wood in King County Projects

**Chris Brummer, PE, LEG, Senior Engineer,
White River Basin Supervisor**

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

**Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section
Rural and Regional Services Section**



King County



**KING COUNTY
FLOOD CONTROL
DISTRICT**

Meeting Overview

- Use of Large Wood in Rivers and Streams
- Large Wood Procedures
- Project Presentations
- Open House



Cedar River

Use of Large Wood in Rivers and Streams

Flow deflection and redirection



Belmondo Revetment Repair

Use of Large Wood in Rivers and Streams

Bank protection



Sinnema Quaale Revetment

Use of Large Wood in Rivers and Streams

Habitat enhancement and mitigation



Belmondo Revetment Repair

Natural Wood Deposition



Cedar River



Tolt River



Green River

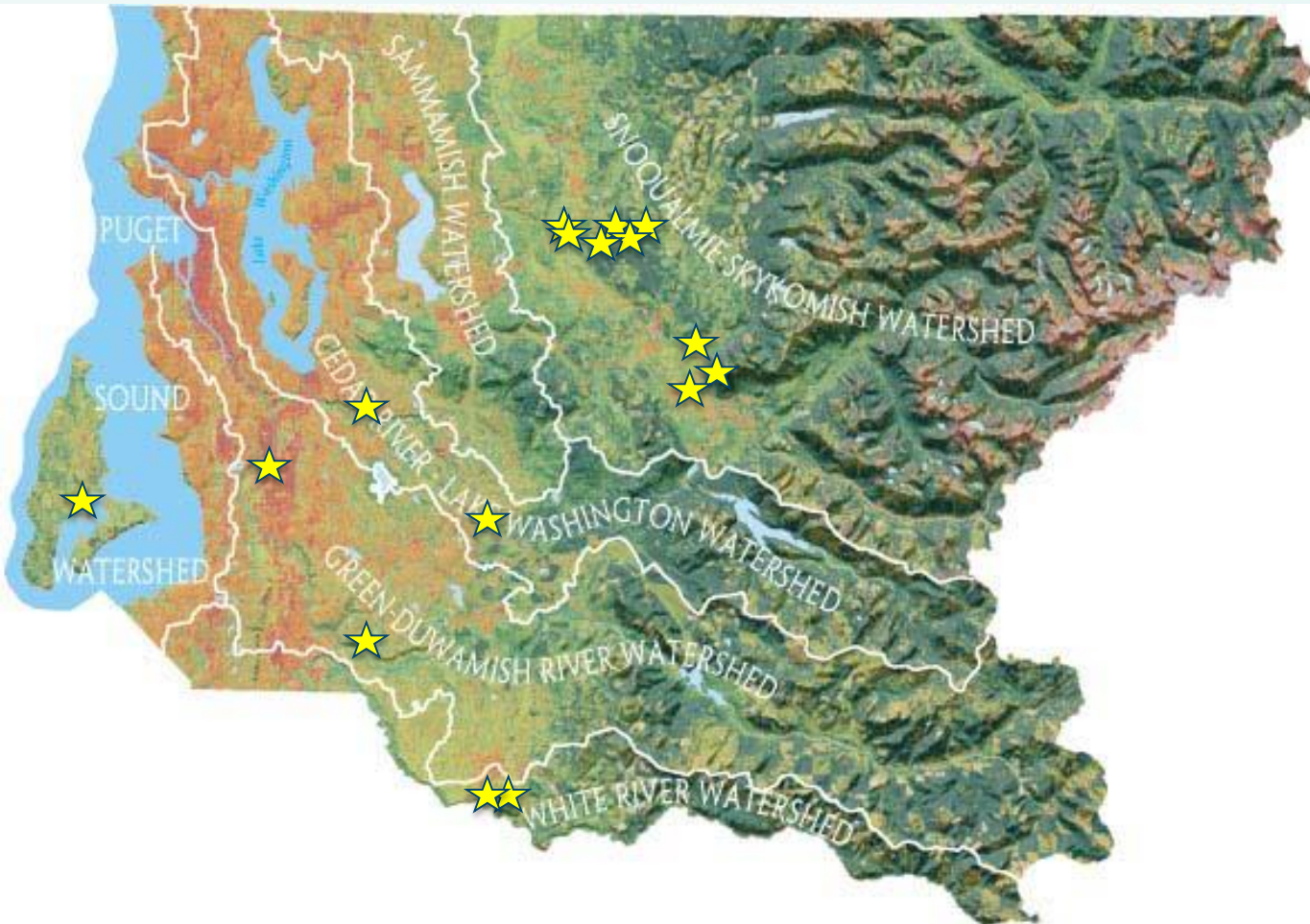
Key Elements of Procedures

- **Public Rule for Considering Public Safety and Procedures for Placed Wood (2010)**
 - Consider public safety in project design
 - Seek public input during design
 - Annual meetings
 - 30% design
 - 60% design
- **Procedures for Managing Naturally Occurring Large Wood (2013)**
 - Naturally occurring wood
 - All KC projects that may affect natural wood

Complementary Elements

- **Outreach**
 - Annual safety awareness campaign
 - River Safety Programs in the Schools
- **Manage project sites**
 - Repairs and modifications
 - Independent review
- **Respond to concerns about natural wood**
 - Modify wood, signage, and close unsafe sections
 - Website describing projects, known hazards, and river safety tips

Project Locations



Cedar River:
Riverbend
Taylor Creek

Green River:
Lones Levee
Tukwila 205

Snoqualmie River:
Shake Mill Left Bank
Si View Levee
Lower Bendigo Right Bank
Stossel Bridge Right Bank

Raging River:
Mouth to Bridge Levee

Tolt River:
Remlinger Levee
San Souci Floodplain
Lower Tolt River
Girl Scout Camp Levee
Frew Levee

White River:
Middle Boise Creek-Van Wieringen
Boise Creek-Evans

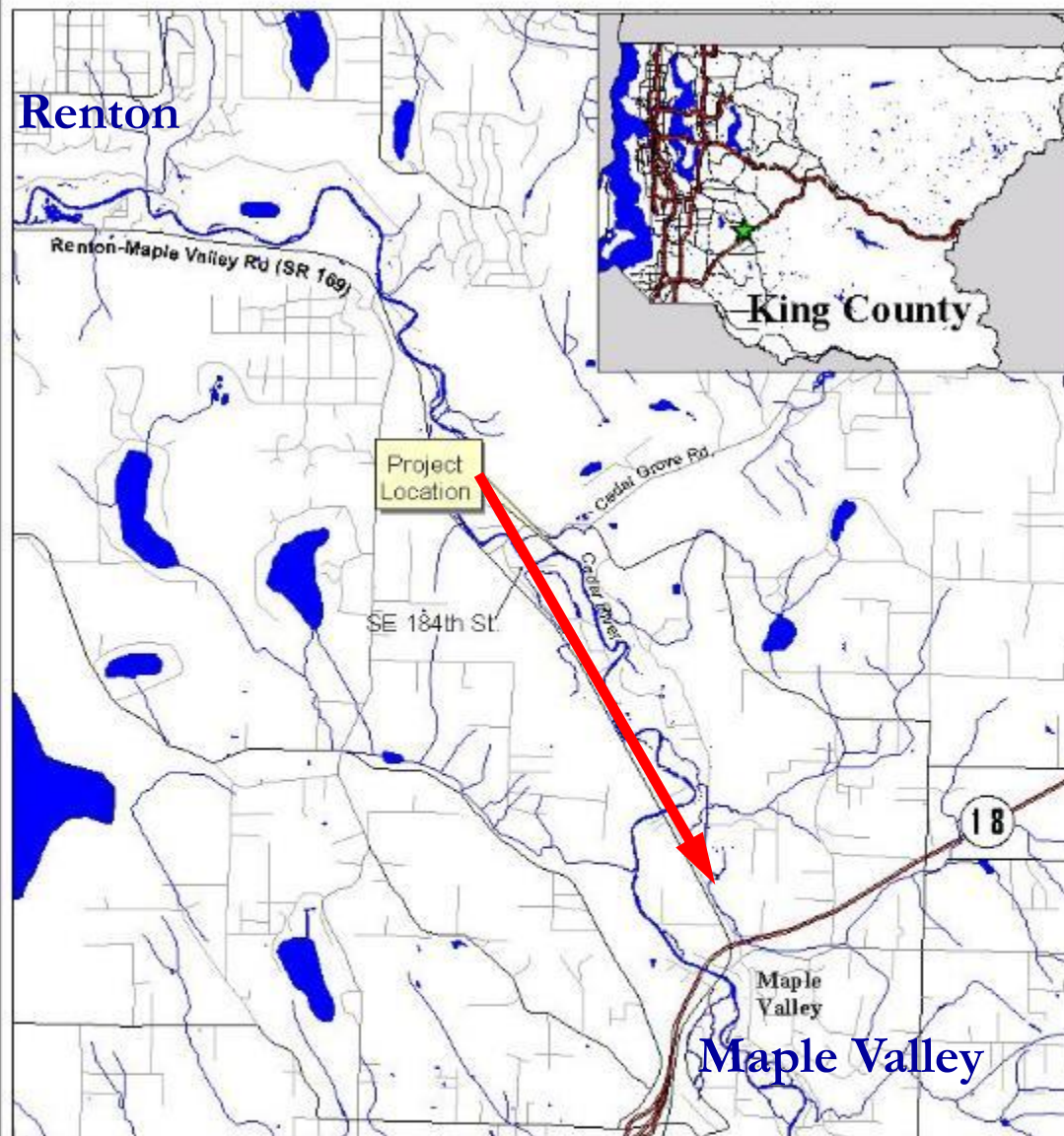
Vashon Island:
Judd Creek Estuary

Small Projects on Non-Recreational Rivers or Streams

Taylor Creek Floodplain Restoration Project



Renton



Vicinity Map

Taylor Creek Lee MRP project



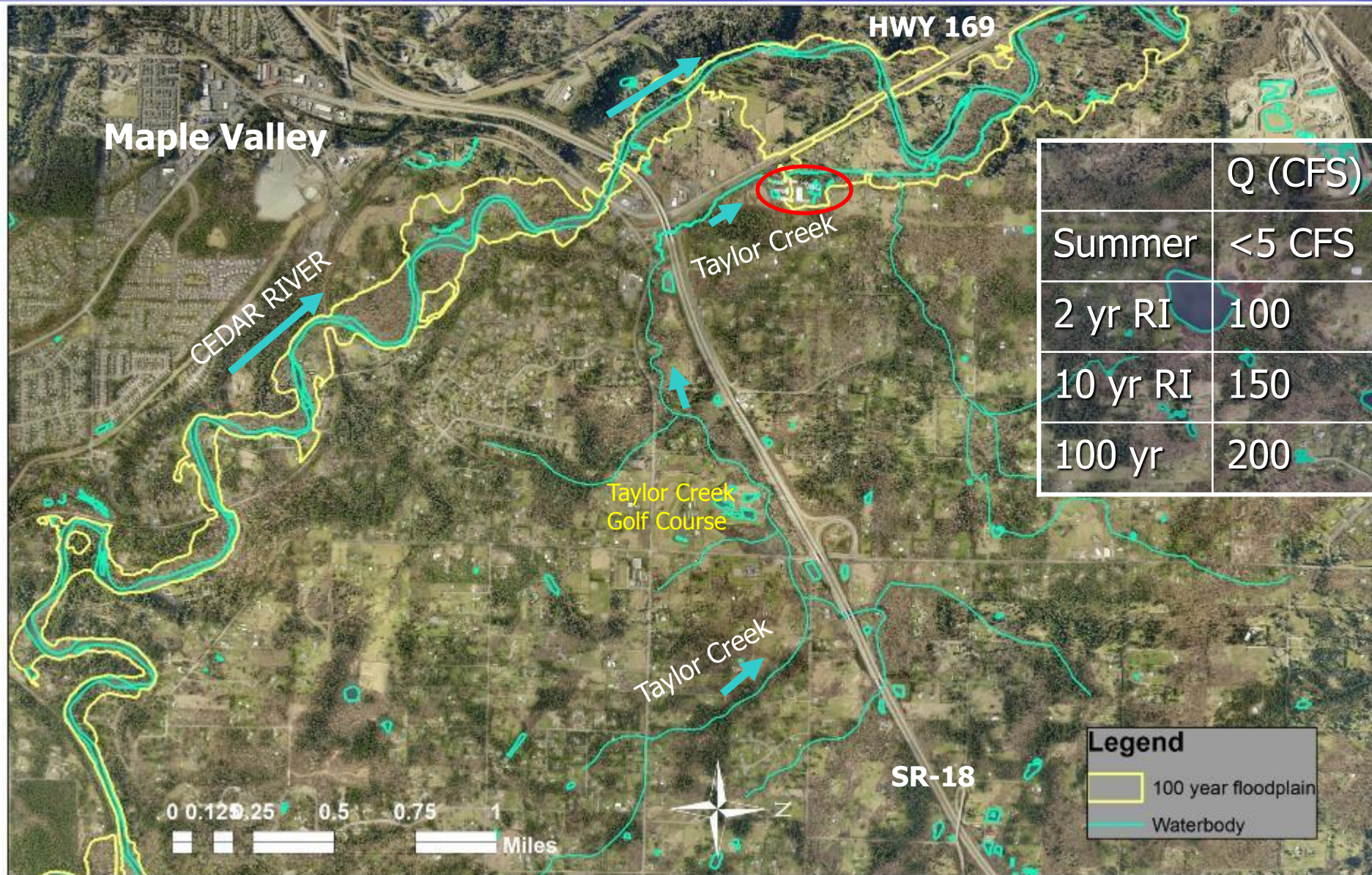
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0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 Miles



King County

Basin Overview



Existing Site Conditions

2015 Orthophoto

No Boaters
in Taylor
Creek

FLOW

FLOW

Current MRP Project
Property Boundary

2005-2006
Restoration/Mitigation Project

Legend

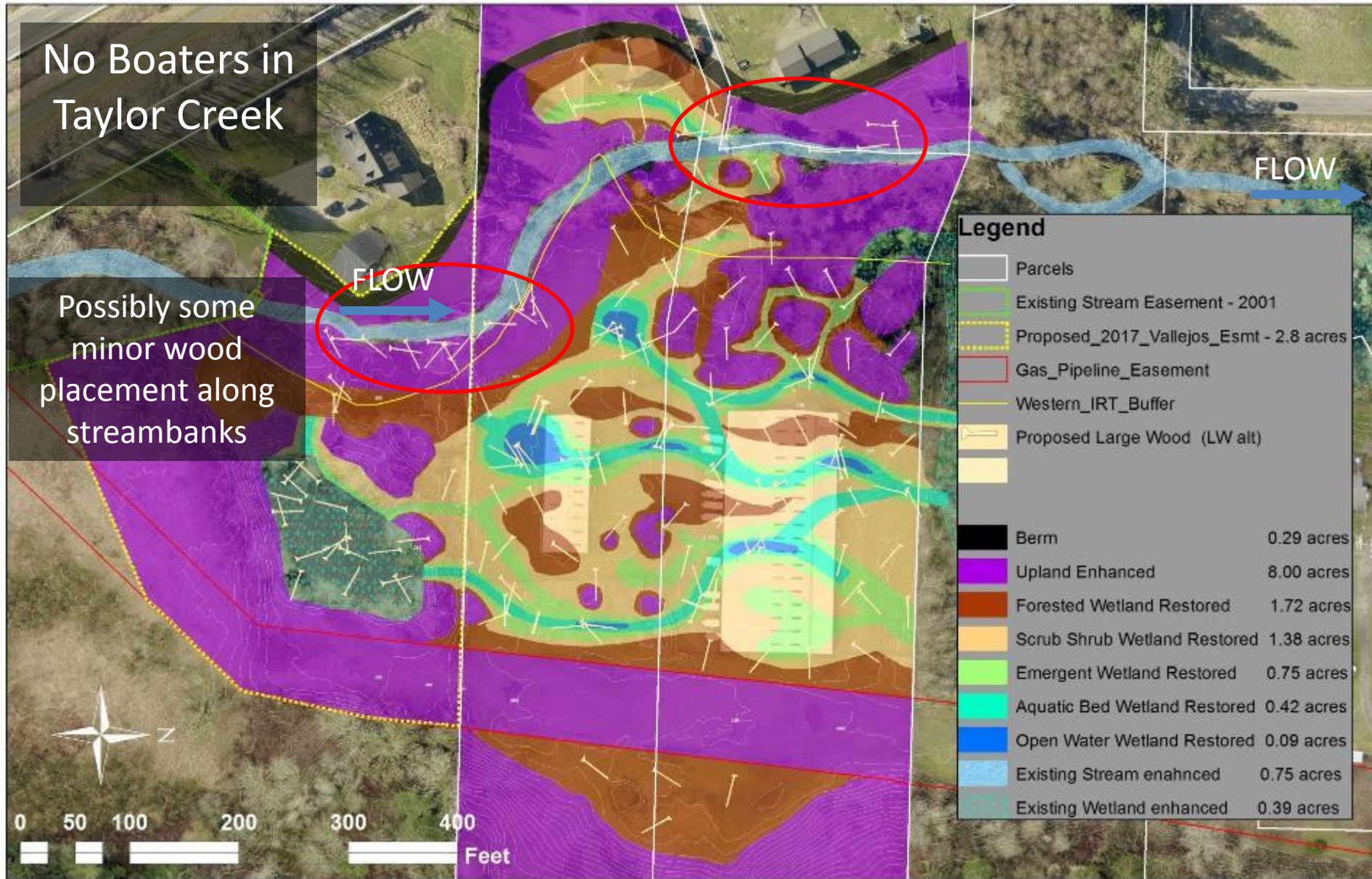
- Parcels
- Existing Stream Easement - 2001
- Proposed_2017_Vallejos_Esmt - 2.8 acres
- Gas_Pipeline_Easement
- Existing_Stream_OHWM
- Existing Wetland



0 50 100 200 300 400
Feet

Proposed Site Conditions

Large wetland, mostly isolated from stream



Schedule:

- 60% Design by August, 2018
- Construction: Summer, 2019

Questions?

Project Manager: Dan Eastman

Dan.Eastman@kingcounty.gov

Or

206-477-4684

Middle Boise Creek Stream Restoration Van Wieringen



Sarah McCarthy, Project Manager
King County Department of Natural Resources and Parks



King County

No Boaters in
Boise Creek

Enumclaw

Osceola

Boise

King County

Pierce County

PROJECT AREA

Boise Creek

White River

SE 440th St

SE 450th St

SE 460th St

SE 470th St

SE 480th St

SE 490th St

SE 500th St

SE 510th St

SE 520th St

SE 530th St

SE 540th St

SE 550th St

SE 560th St

SE 570th St

SE 580th St

SE 590th St

SE 600th St

SE 610th St

SE 620th St

SE 630th St

SE 640th St

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SE 1100th St

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SE 1120th St

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SE 1140th St

SE 1150th St

SE 1160th St

SE 1170th St

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SE 2980th St

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SE 3100th St

SE 3110th St

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SE 3200th St

SE 3210th St

SE 3220th St

SE 3230th St

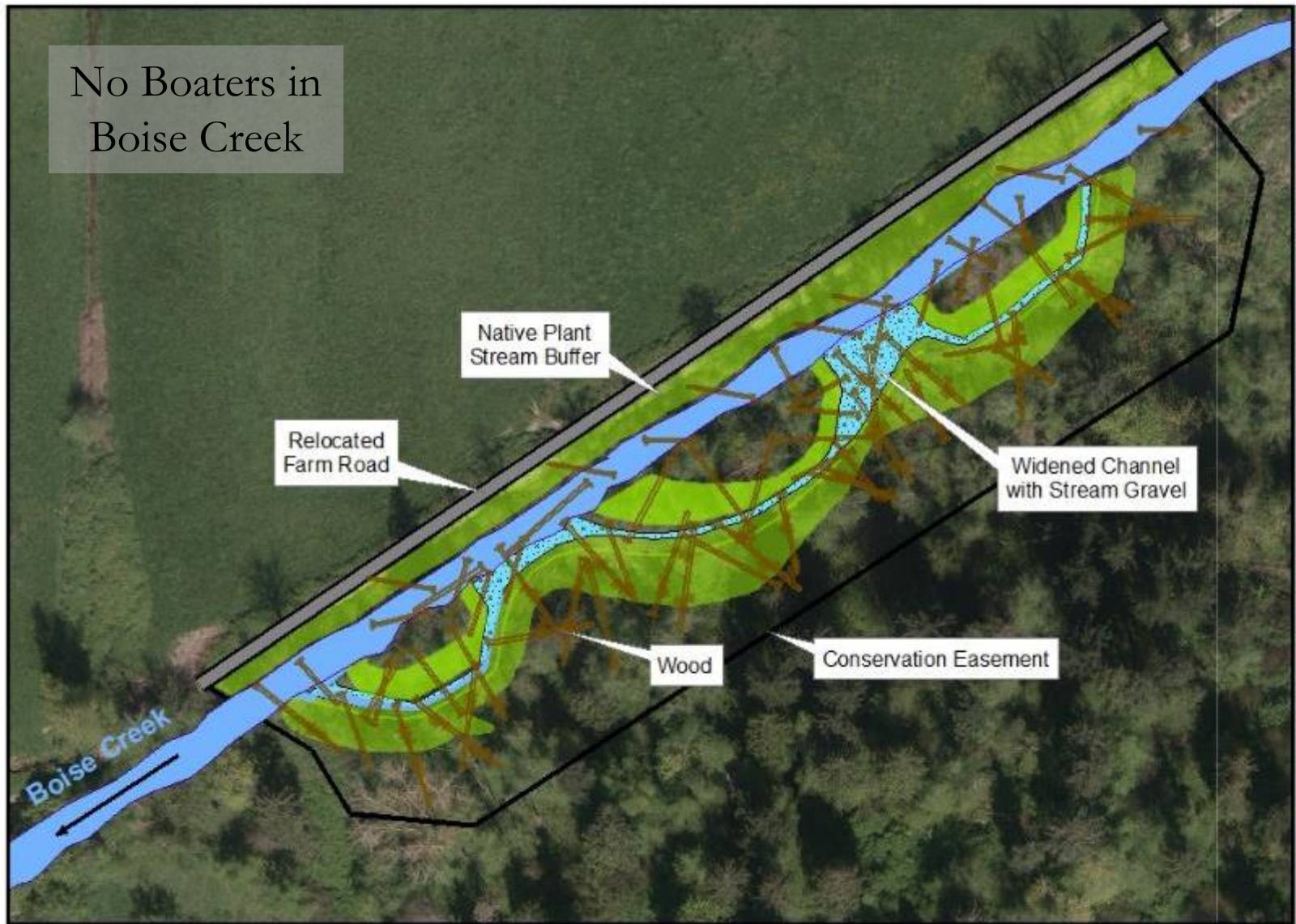
SE 3240th St

SE 3250th St

SE 326



No Boaters in
Boise Creek



Schedule

Activity	Timing
30% Design complete	June 2017
60% Design complete	November 2017
Permit applications submitted	December 2017
Construction	Summer 2018
Planting	Fall 2018-Winter 2019

Contact Information

Sarah McCarthy, Project Manager

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Middle Boise-Evans Adaptive Management Project

Josh Latterell, Ph.D., Project Manager

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

Department of Natural Resources and Parks

Water and Land Resources Division

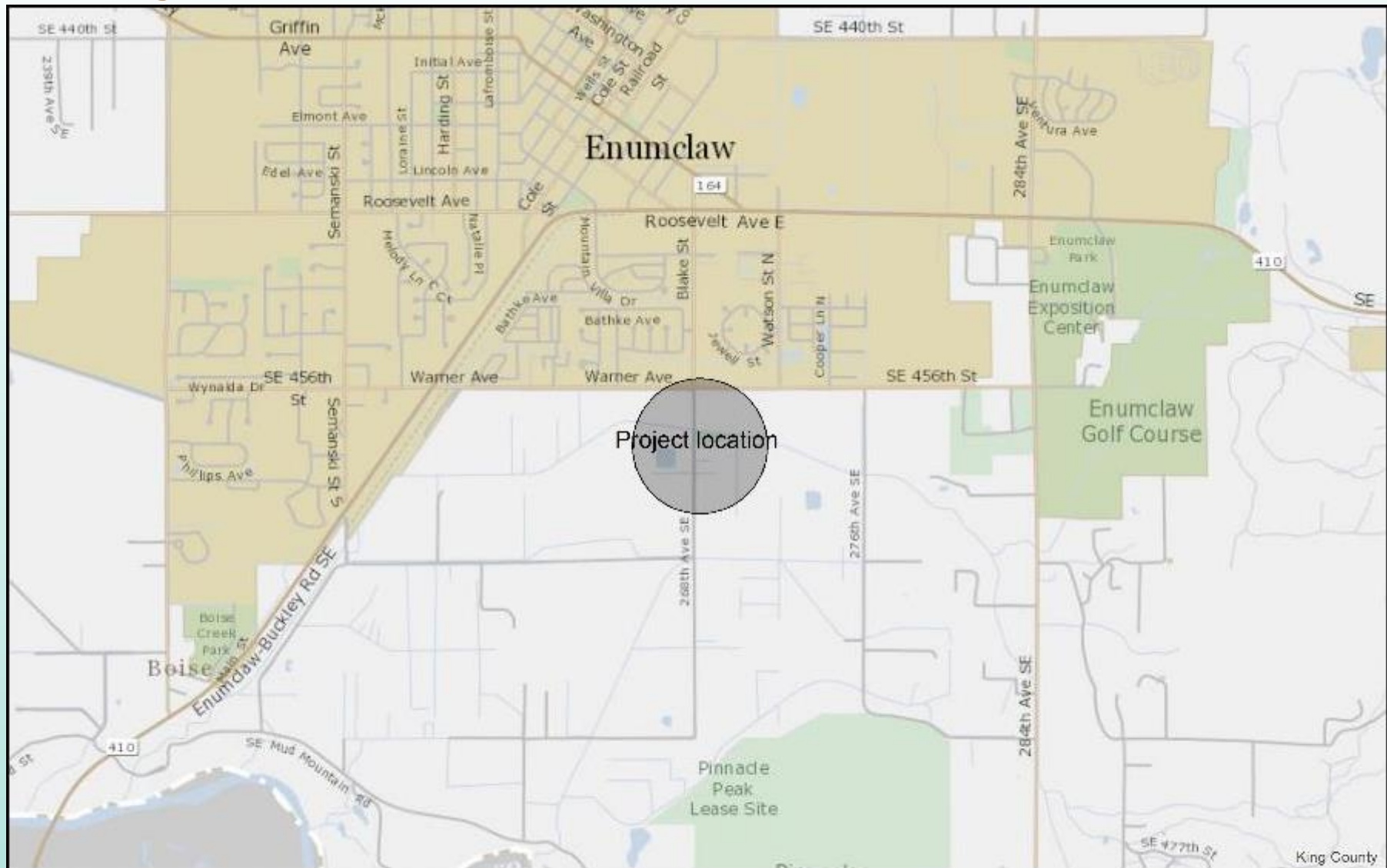
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Ecological Restoration and Engineering Services Unit



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Project Location



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Date: 6/6/2018

Notes:



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GIS CENTER

Project Background



05/19/2017

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Project Description

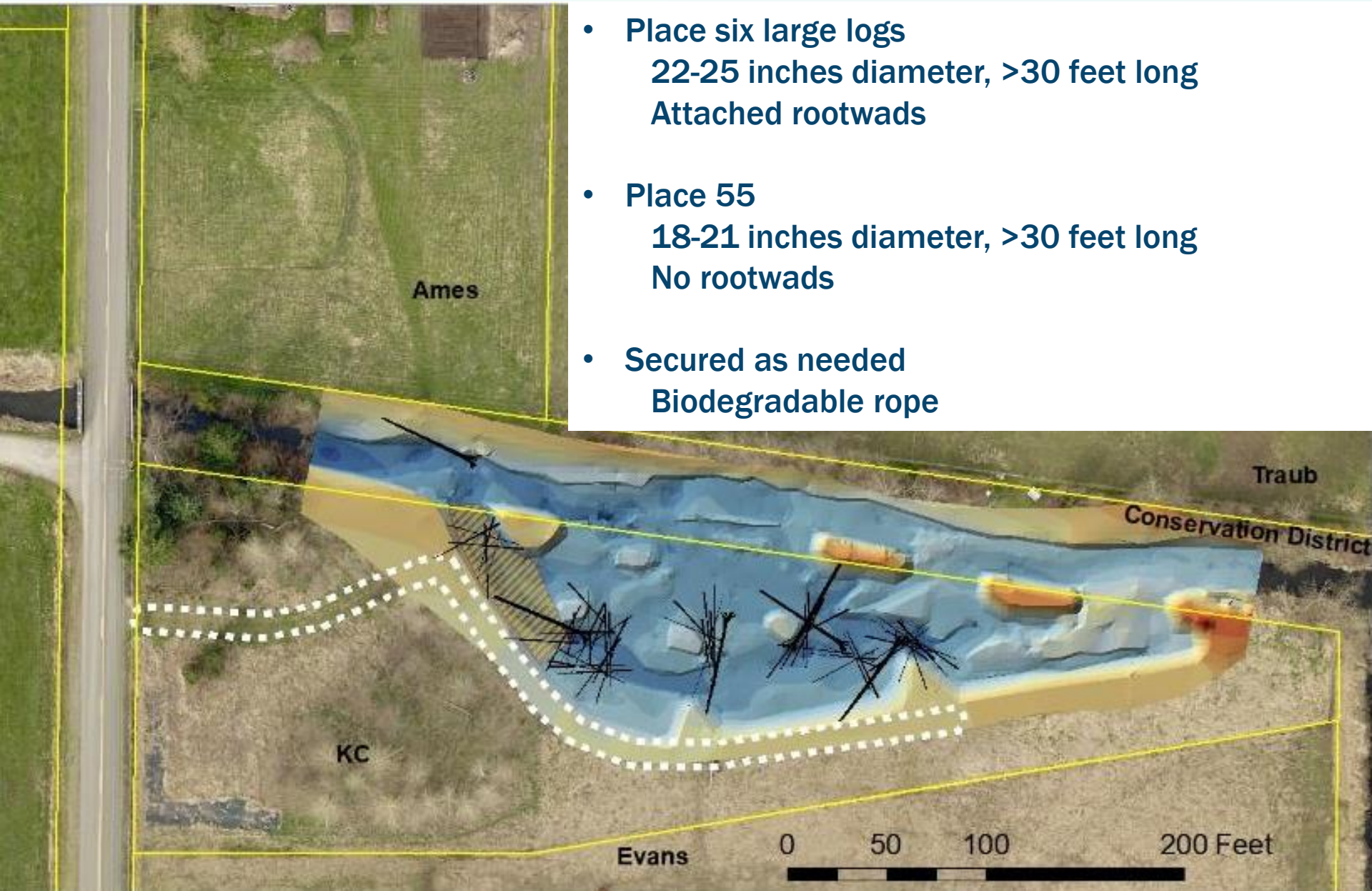
Goal: Improve fish habitat in a restoration project completed in 2013.

Informed by a community meeting held in 2016.

Honors commitments to Muckleshoot Tribe and Corps permit to place more large wood if it could be done without compromising project goals.

Proposed Project Actions

- Place six large logs
22-25 inches diameter, >30 feet long
Attached rootwads
- Place 55
18-21 inches diameter, >30 feet long
No rootwads
- Secured as needed
Biodegradable rope



Project Timeline

- Design complete – Spring 2018
- Construction begins – July 2018
- Construction complete – Summer 2018

Questions?



Q



A



Josh Latterell, Project Manager
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Lower Tolt River 2018 Adaptive Management Project

Cindy Young, Project Manager

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

Department of Natural Resources and Parks

Water and Land Resources Division

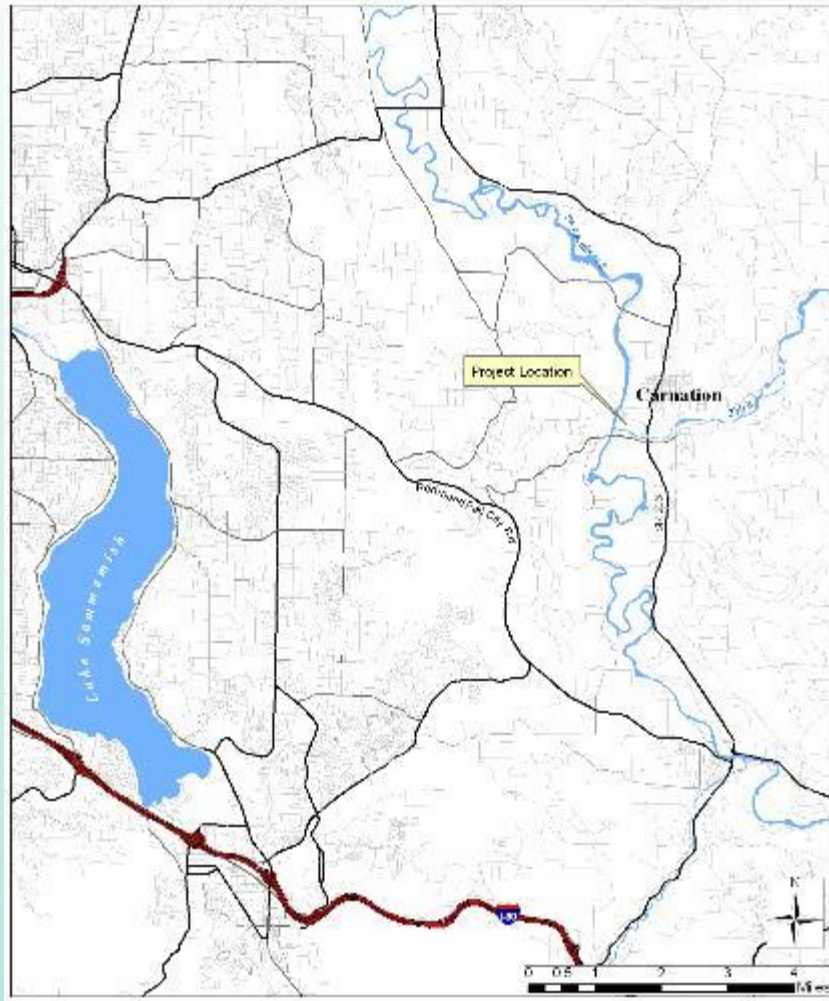
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Ecological Restoration and Engineering Services Unit



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Project Location



Lower Tolt River 2018 Adaptive Management Project

Goal: Restore and enhance salmon habitat on the Tolt River by reconnecting the river to its historic floodplain.

Objectives:

- Remove the remaining rock from the Lower Tolt River Levee.
- Install ~10 pieces of woody debris in the floodplain (outside the present active channel).
- Logs will be threaded between existing trees or tied off to trees with rope.

Lower Tolt River 2018 Adaptive Management-2017 Aerial



Questions?



Q



A



Cindy Young, Project Manager
206-477-4859
cindy.young@kingcounty.gov



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Judd Creek Projects: Judd Creek Estuary Enhancement and Judd Creek/Paradise Valley SHRP

Laird O'Rollins and Paul Adler, Project Managers

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

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Water and Land Resources Division

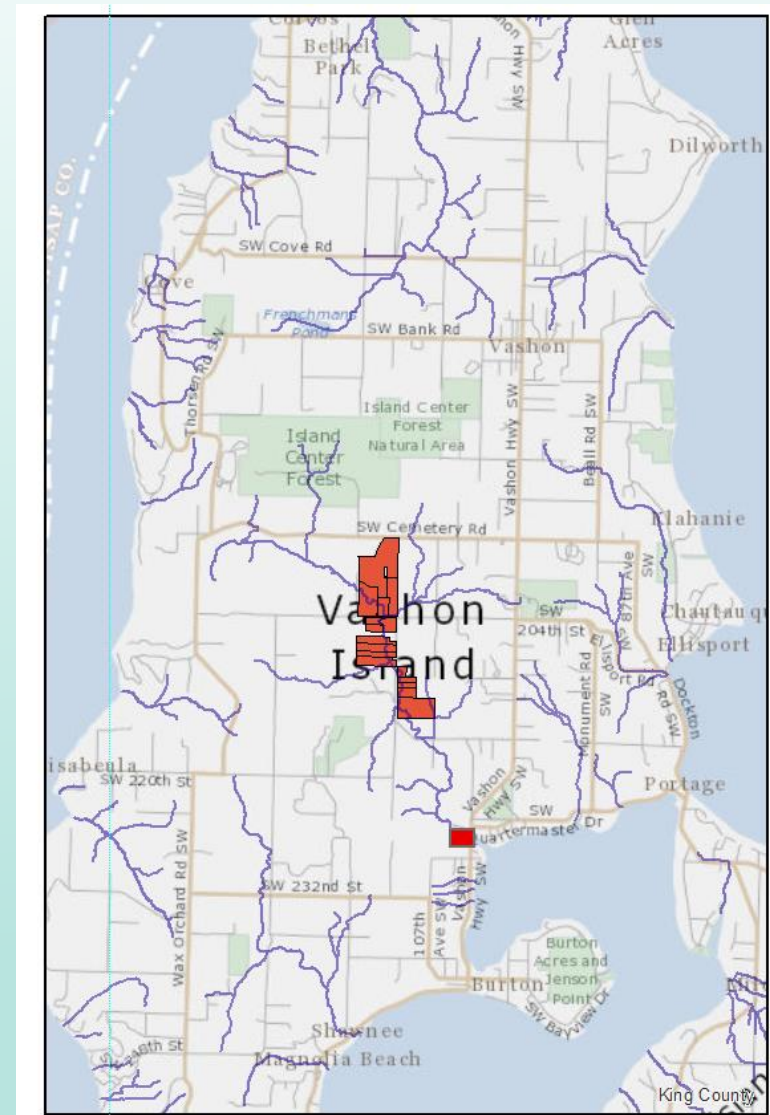
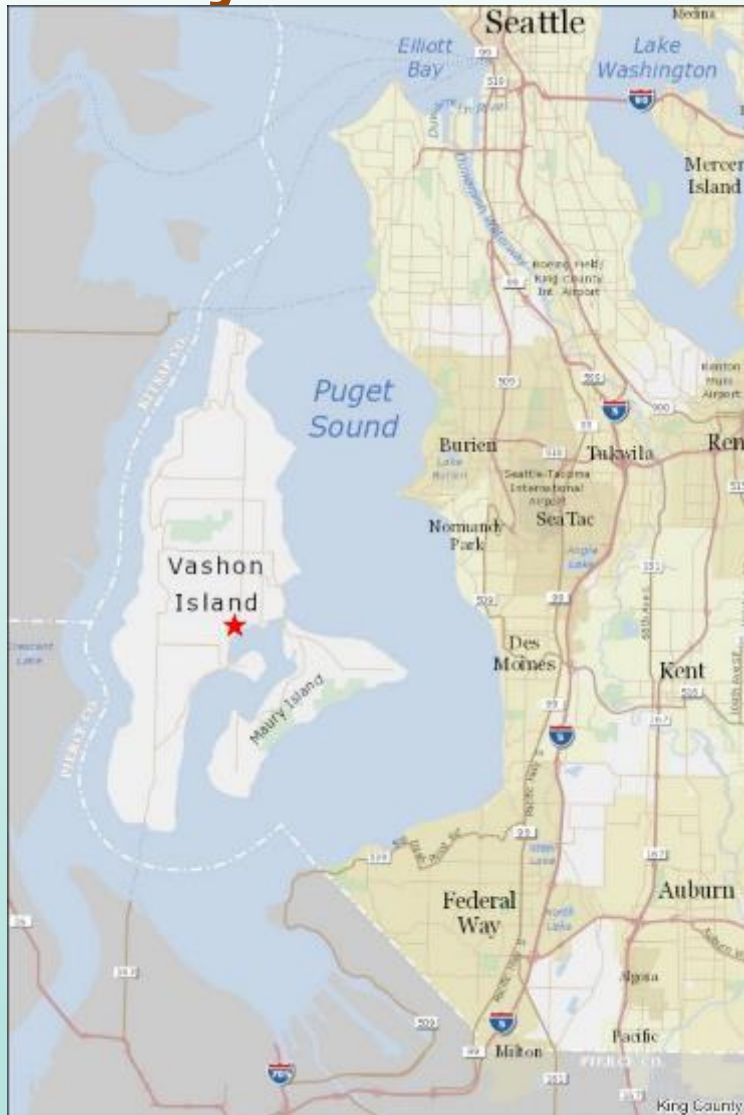
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All work on properties owned by the Vashon Maury Island Land Trust



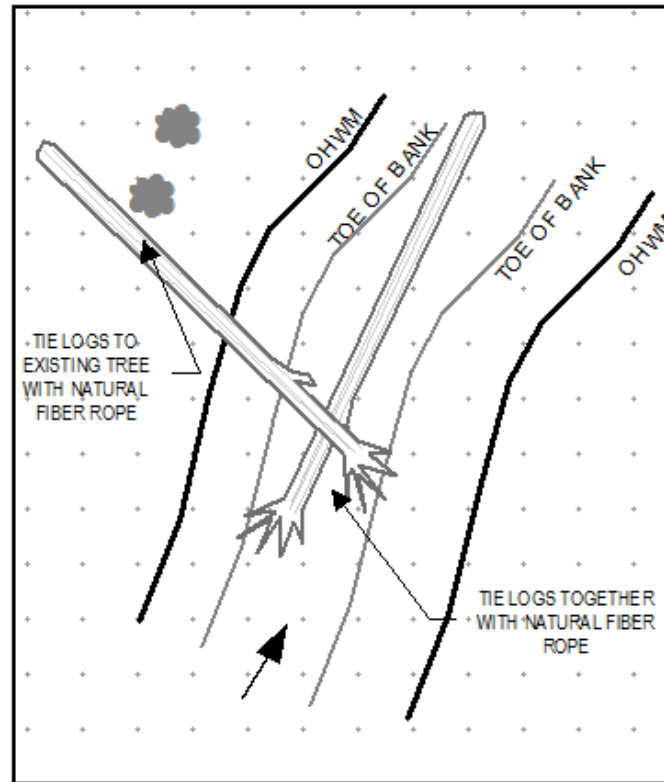
Work in Estuarine Reach near Quartermaster Harbor

- Place 24 logs in 350' reach
- Upstream end of tidal influence
- Creek used by coho salmon for spawning and rearing and by Chinook salmon for juvenile refuge and feeding
- No floating and very little recreation



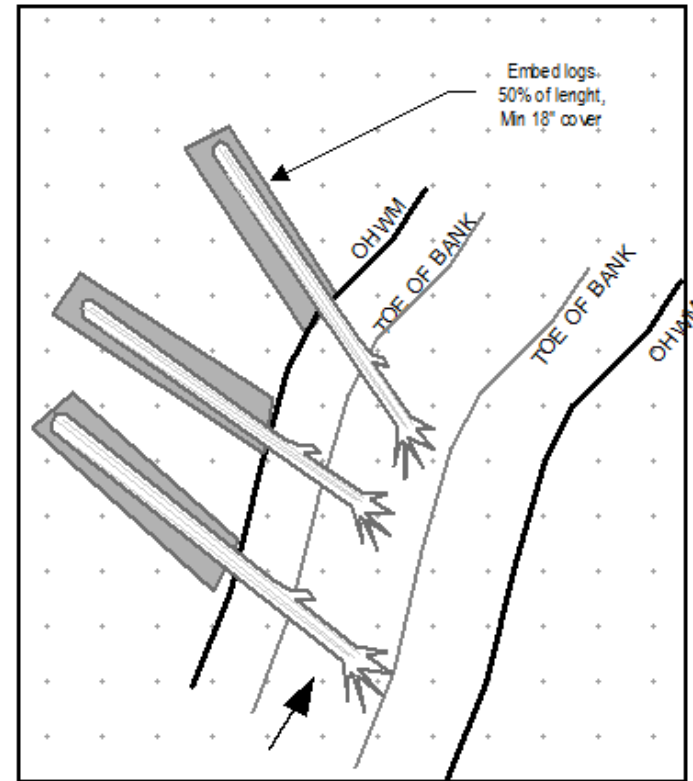
Upstream/Paradise Valley Work

- Project will install 100 pieces of large wood along 2,000 linear feet of Judd Creek
- Logs will be either buried into the bank, or secured to existing trees.



LOG PLACED ON BED BELOW
LOG KEYED INTO EXISTING TREES

STREAM LWD DETAIL B



LOG COMPLEX WITH
KEY LOGS EMBEDDED INTO BANK

STREAM LWD DETAIL C

Questions?



Q

Laird O'Rollins, Project Manager
for estuarine reach
206-477-4790
Laird.orollins@kingcounty.gov



A

Paul Adler, Project Manager for
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San Souci Floodplain Restoration Project

Rachael Vaicunas, PE, Senior Engineer

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

Department of Natural Resources and Parks

Water and Land Resources Division

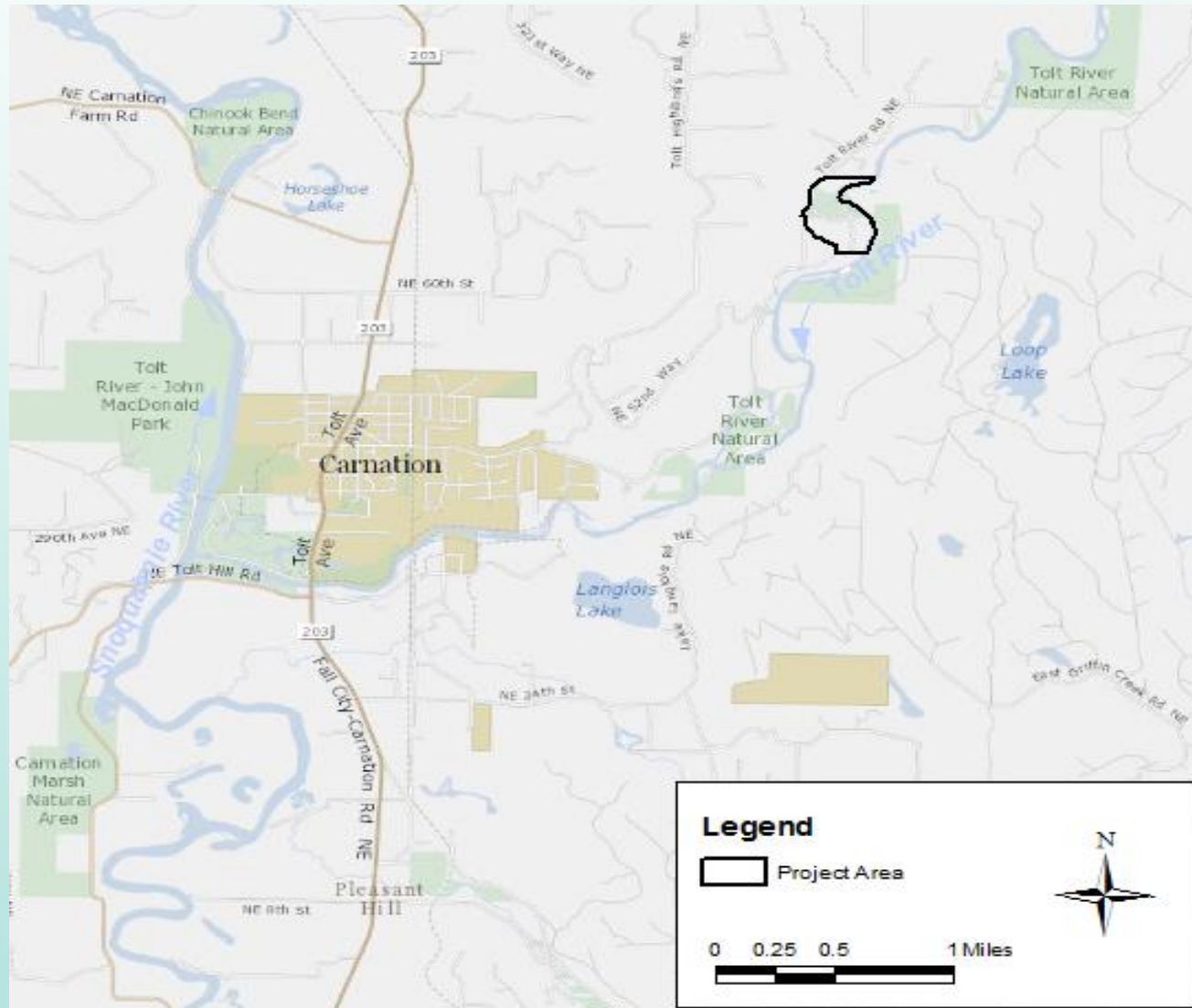
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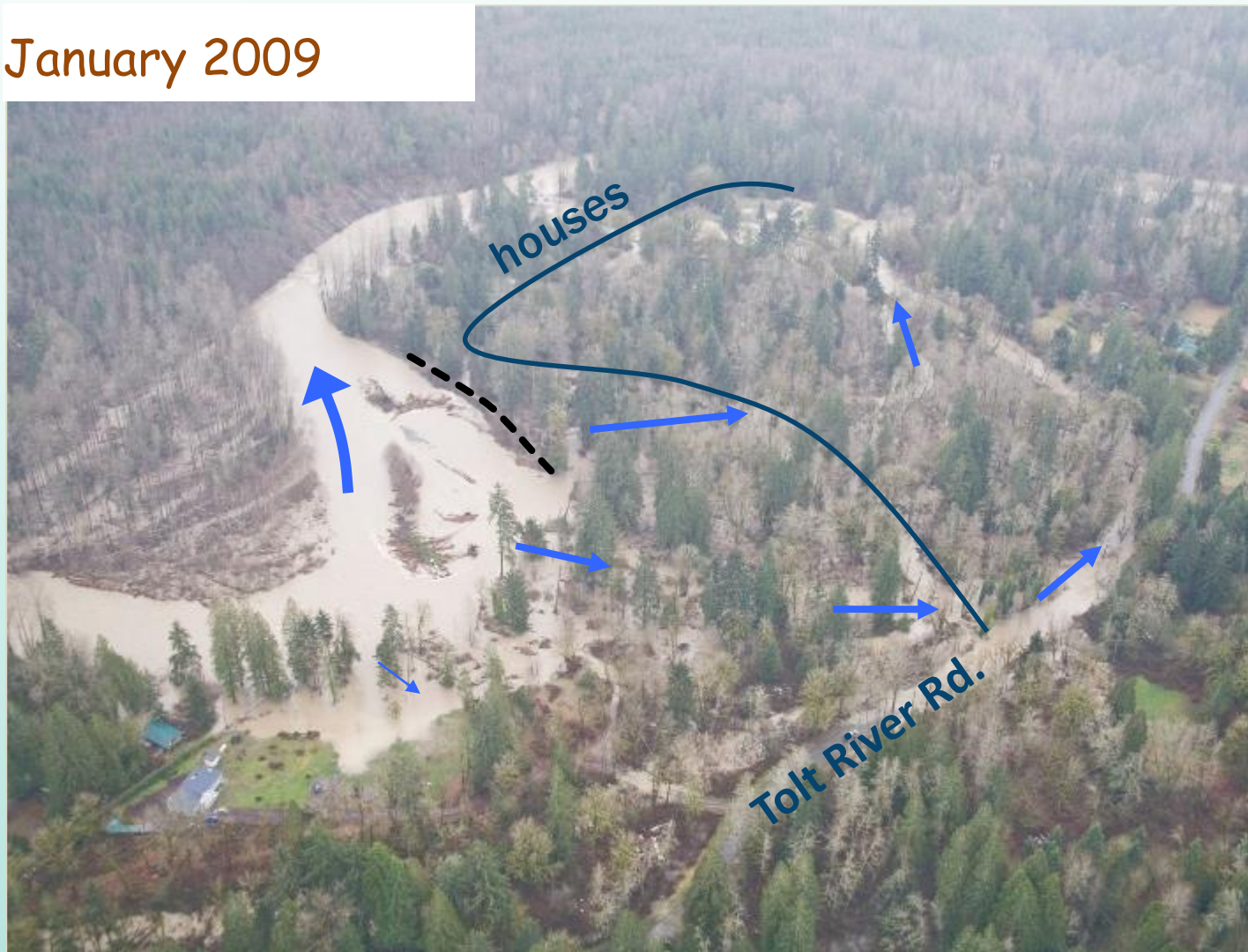
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Project Location

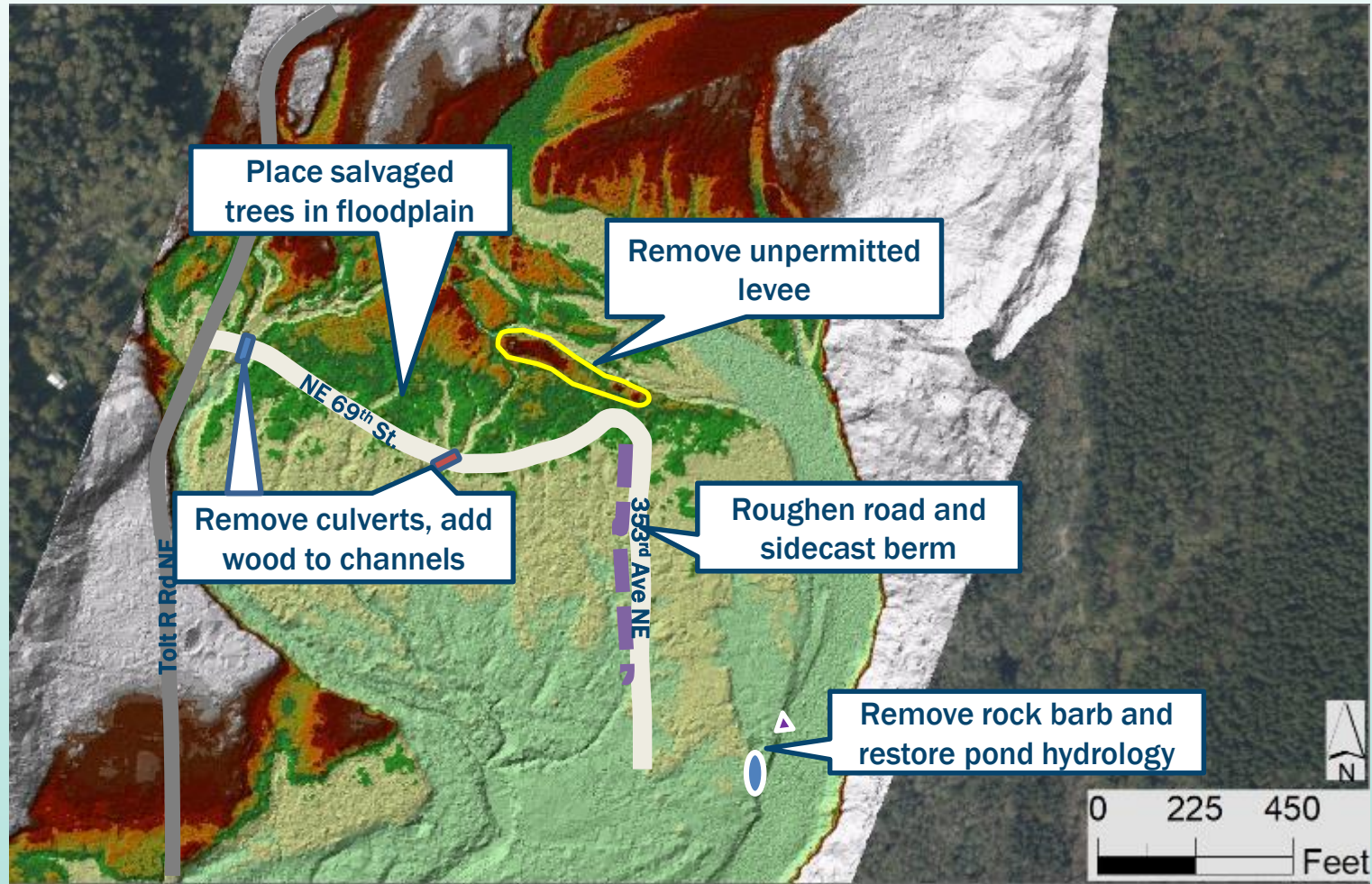


Project Background

January 2009



Proposed Project Actions



Large Wood Proposal

- Salvage trees required to be removed for construction (up to 15)
- Place salvaged logs in floodplain and side channels
- No wood placement proposed in mainstem Tolt River, which has recreational users including boaters, tubers, and fishermen

Project Timeline

- Levee removal- Fall 2018
- Floodplain restoration – Summer 2019
- Construction complete – Summer 2019

Questions?



Q



A



Scott Muchard, PE, Project Manager
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King County

Five Small Levee Repair Projects in the Snoqualmie Basin

Gus Kays, PE, Senior Engineer,
Snoqualmie River Basin

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

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Water and Land Resources Division
River and Floodplain Management Section



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Snoqualmie River, Tolt River, Raging River, and South Fork Snoqualmie River (2 sites)



Snoqualmie River

Stossel Bridge Levee



- Mitigation for small repair to levee on right bank of Snoqualmie River, which occurred in 2017
- Rock was used in repair
- Twenty logs to be placed in water as WDFW permit requirement
- New repair needed for 2018
- 2013 recreational use study shows low level of floater use

Damaged levee (pre-2017 repair)



Area where wood will be placed

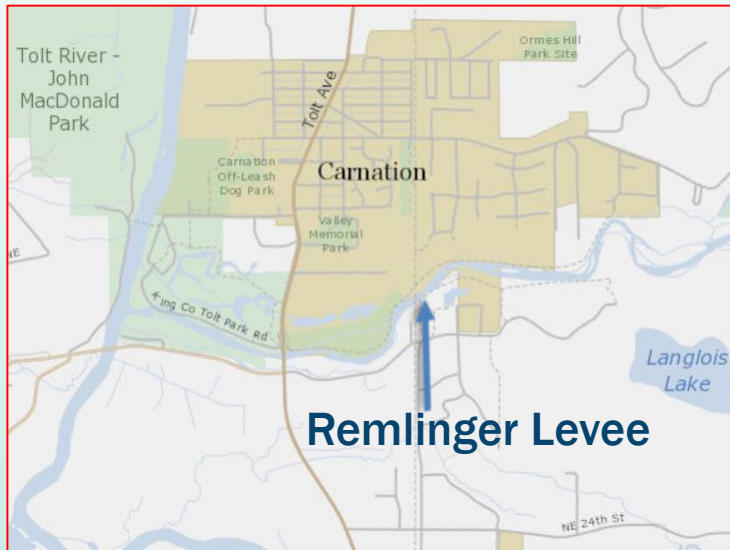


Damaged levee for 2018 repair



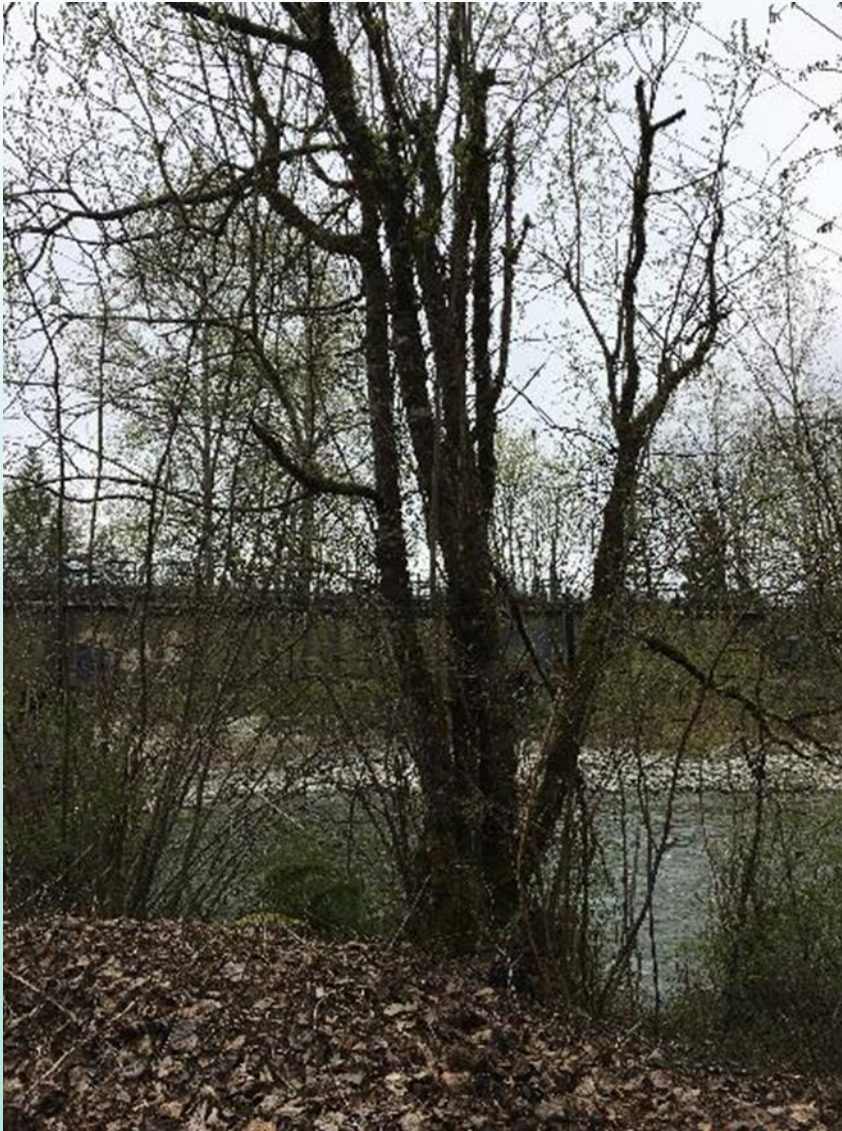
Tolt River

Remlinger Levee Repair



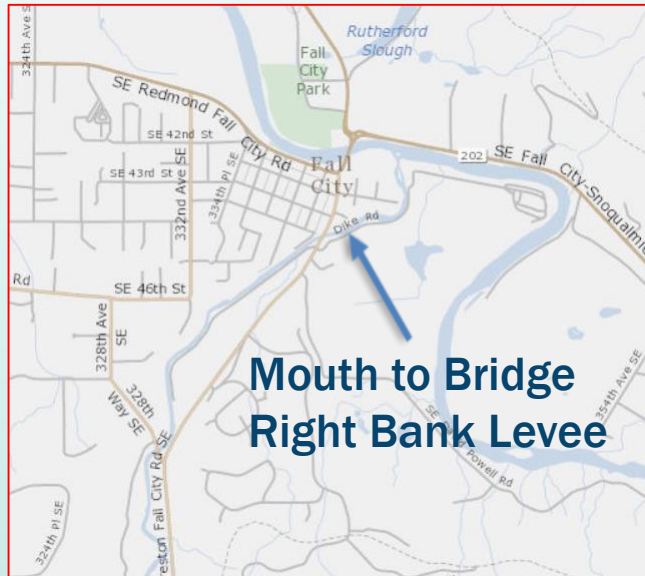
- Replacing rock on levee to repair small section of damage
- Small willow needs to be removed as part of repair
- Willow to be placed in river as WDFW mitigation for its removal
- Root wad – attached or unattached to tree – will also go in water as mitigation
- 2013 recreational use study shows low level of floater use

Location of willow and placement site



Raging River

Mouth to Bridge Levee Repair



- Replacing rock on levee to repair small section of damage
- Six bigleaf maples need to be removed as part of repair
- Trees will be placed in river as WDFW mitigation for their removal
- Root wads – attached or unattached to trees – will also go in water as mitigation

Some of the maples to be removed



South Fork Snoqualmie River

Si View Levee Repair



- Replacing rock on levee to repair small section of damage
- Up to 13 trees may need to be removed
- Trees will be placed in river as WDFW mitigation for their removal
- Root wads – attached or unattached to trees – will also go in water as mitigation

Some of the trees to be removed



South Fork Snoqualmie River

Bendigo Lower Levee Repair



- Repairing a 330-foot section of levee that is deficient
- Up to 10 trees could be removed (goal is to save as many as possible)
- Trees will be placed in river as WDFW mitigation for removal
- Root wads – attached or unattached to trees – will also go in water as mitigation

A section of the deficient levee



Project Schedule

- All construction will occur between July – October 2018
- 30% drawings will be posted when available


Questions?



Q



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For additional information:
Stella Torres, Project Manager
River and Floodplain Management Section
(206) 263-0969
storres@KingCounty.gov
www.kingcounty.gov/rivers



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Fall City Area Large Wood Alteration Mitigation

Gus Kays, PE, Senior Engineer,
Snoqualmie River Basin

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section



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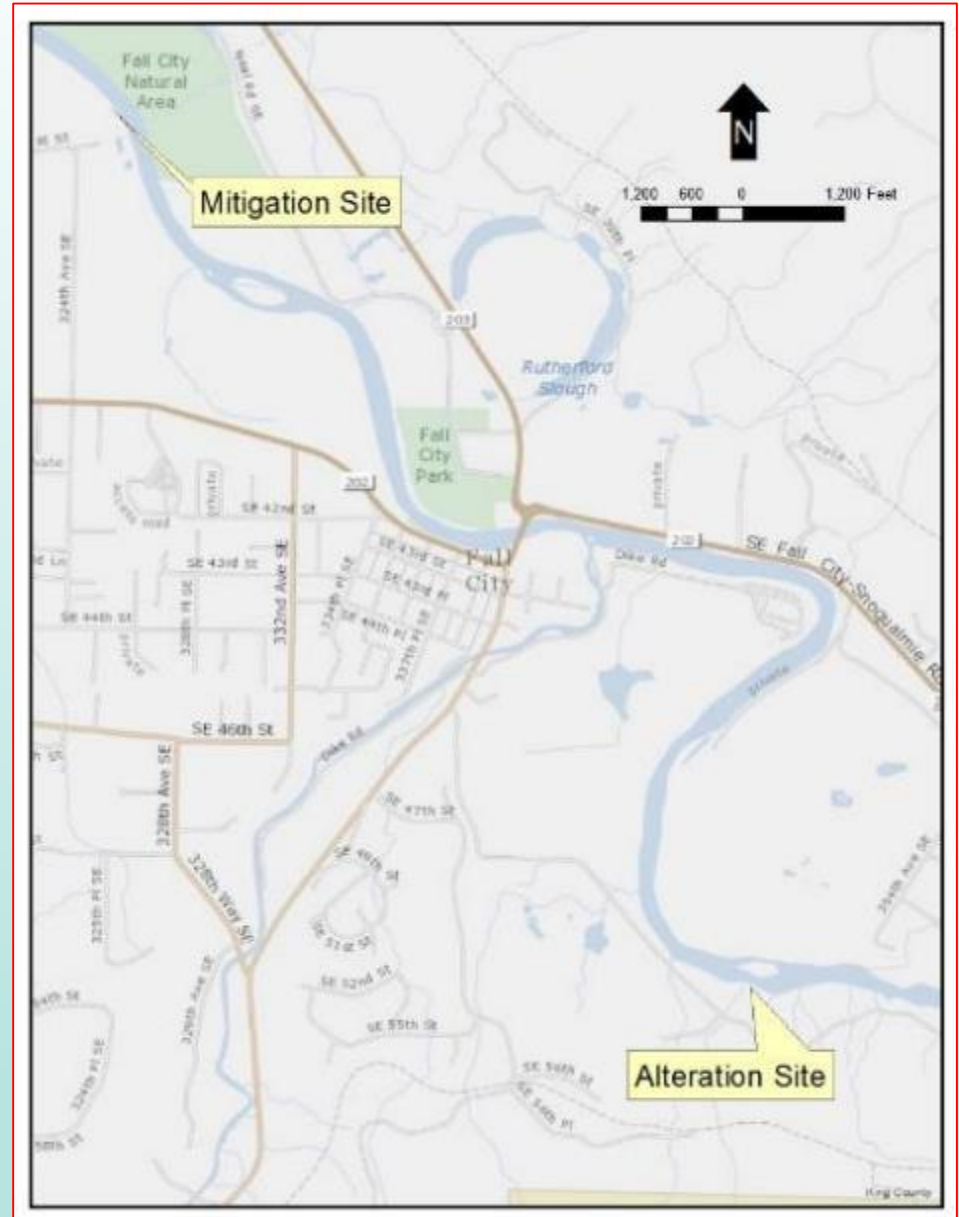
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In 2017, King County shifted logs above Fall City to reduce risks to river users in this high-use reach.



Location of Alteration and Mitigation Sites

- Both sites are on Snoqualmie River and near Fall City.
- Alteration site has high recreational use: 2013 study shows 90% of Snoqualmie floaters use this reach
- Mitigation site has low use: 2013 study shows 5 to 7% in reach below Carnation



Fall City Area Large Wood Alteration Mitigation

- WDFW requires mitigation for the alteration of naturally occurring logs
- Current plan: to place 5 or more logs along the left bank at the Aldair Levee.
- Actual number of logs will depend on final mitigation requirements.

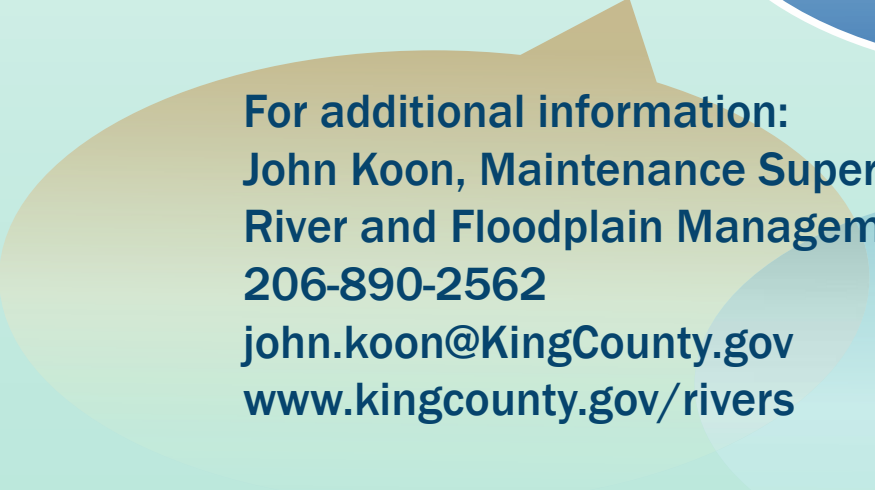
Questions?



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For additional information:
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Shake Mill Left Bank Project

**Gus Kays, PE, Senior Engineer,
Snoqualmie River Basin**

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Water and Land Resources Division
River and Floodplain Management Section**



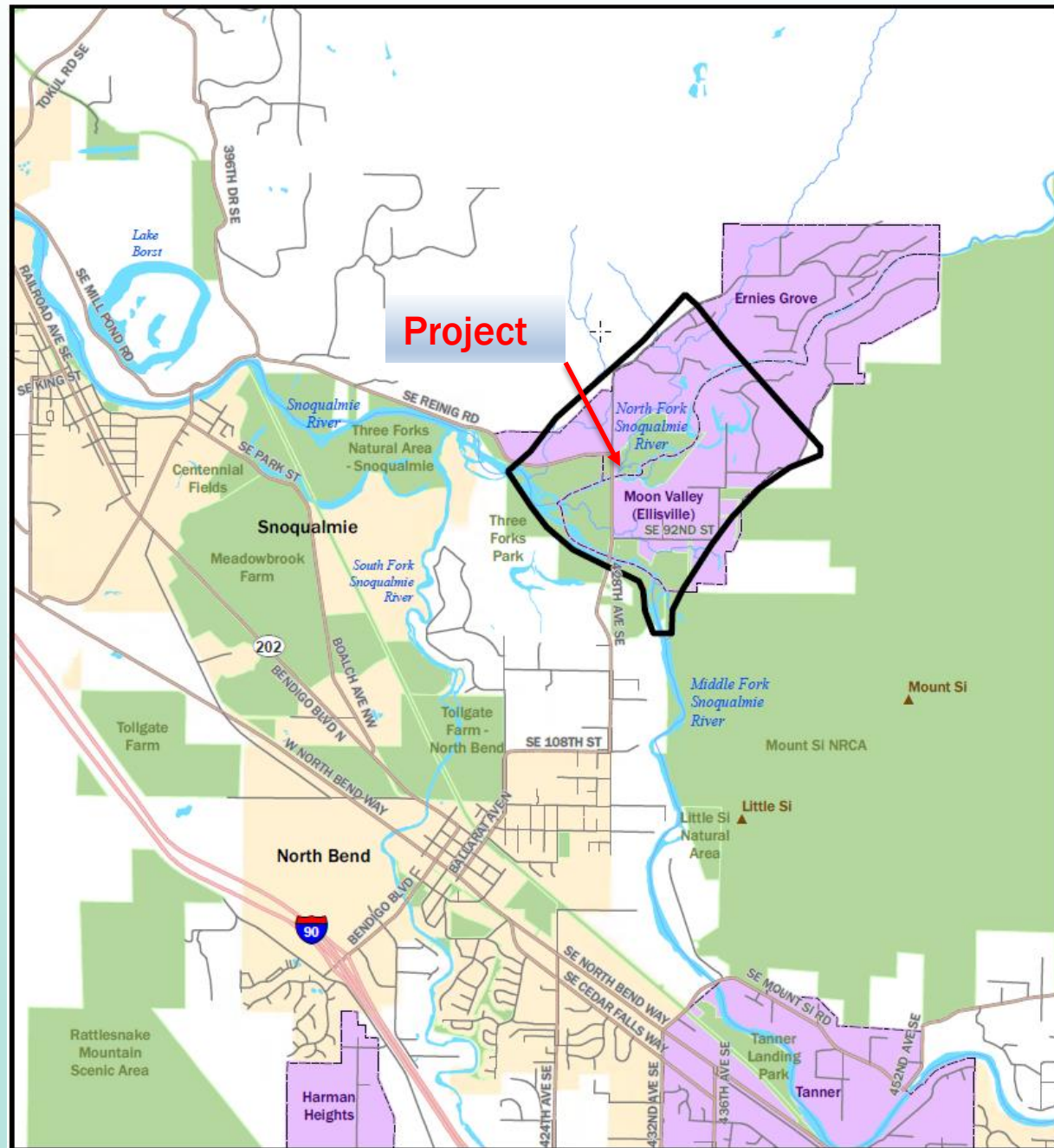
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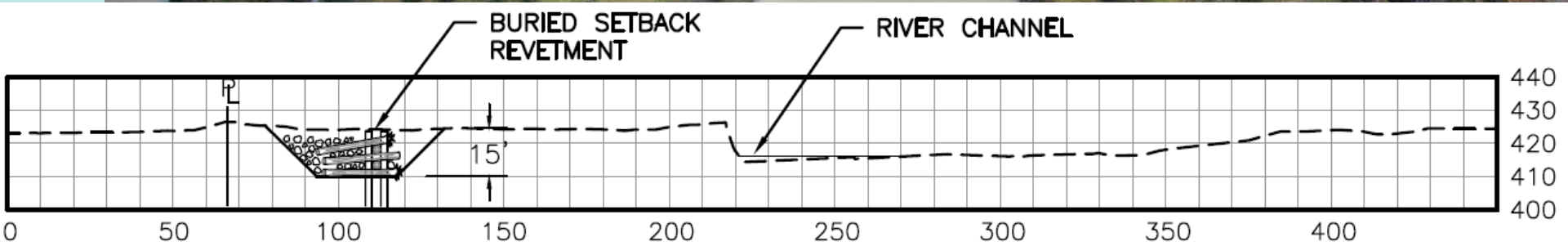


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Project information

- North Fork Snoqualmie, upstream of 428th Ave SE
- Ongoing erosion 2009 to present
- Project entails setback revetment
- Construction planned for summer-fall 2019





Questions?



Q



A



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www.kingcounty.gov/rivers



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Lones Levee Setback and Floodplain Restoration

Jon Hansen, Project Manager

June 12, 2018 – Issaquah Fish Hatchery

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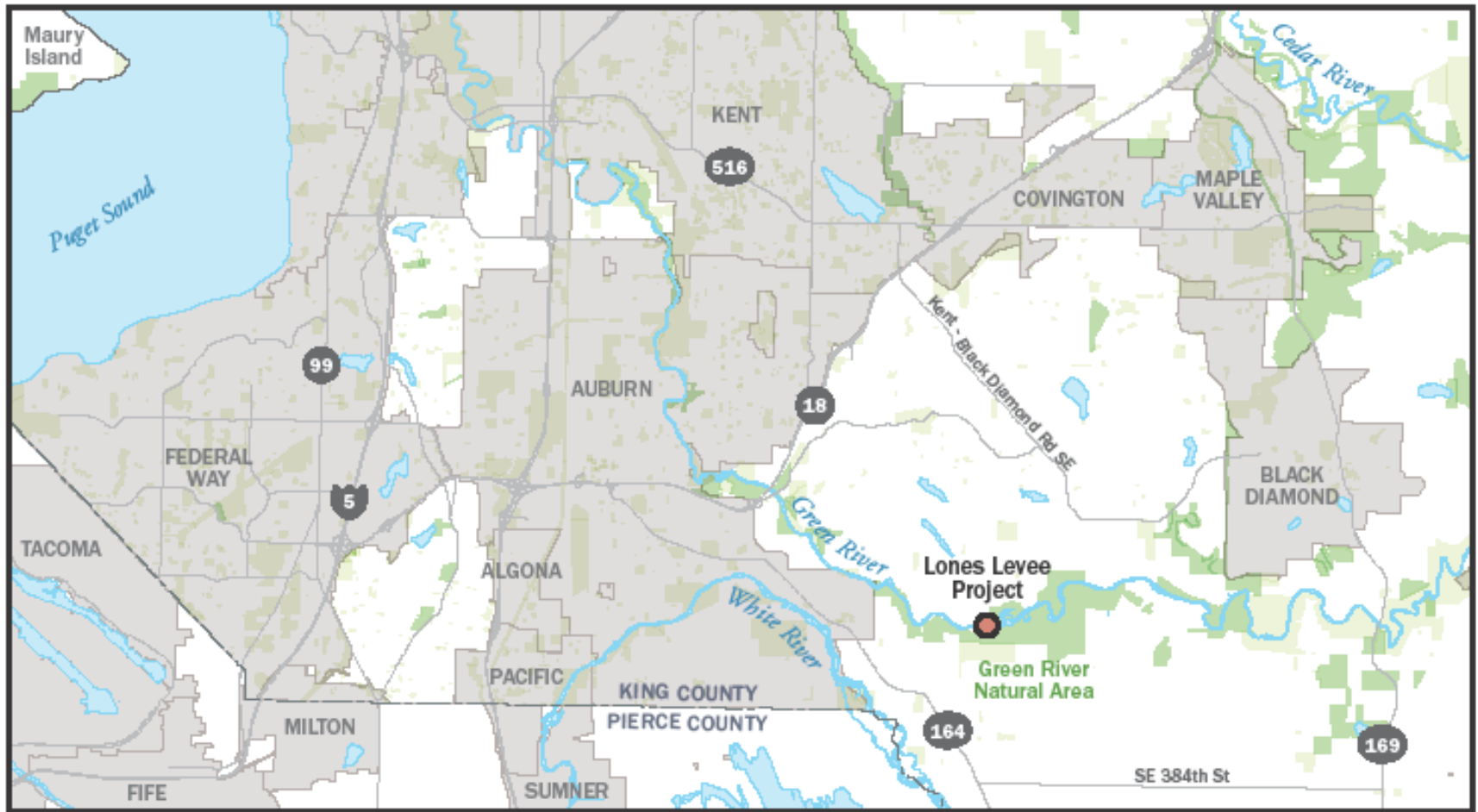
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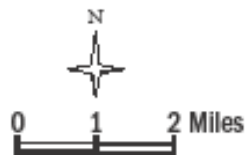


King County

LONES LEVEE: Vicinity Map



-  Project Location
-  King County Parks
-  Other Open Space
-  City Area
-  River



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Green Valley Road

Existing Conditions

Private agricultural land
and residences

Flow

Burns
Creek

Historic river
channel

Levee
damage

Green River

Lones Levee
constructed in
1960

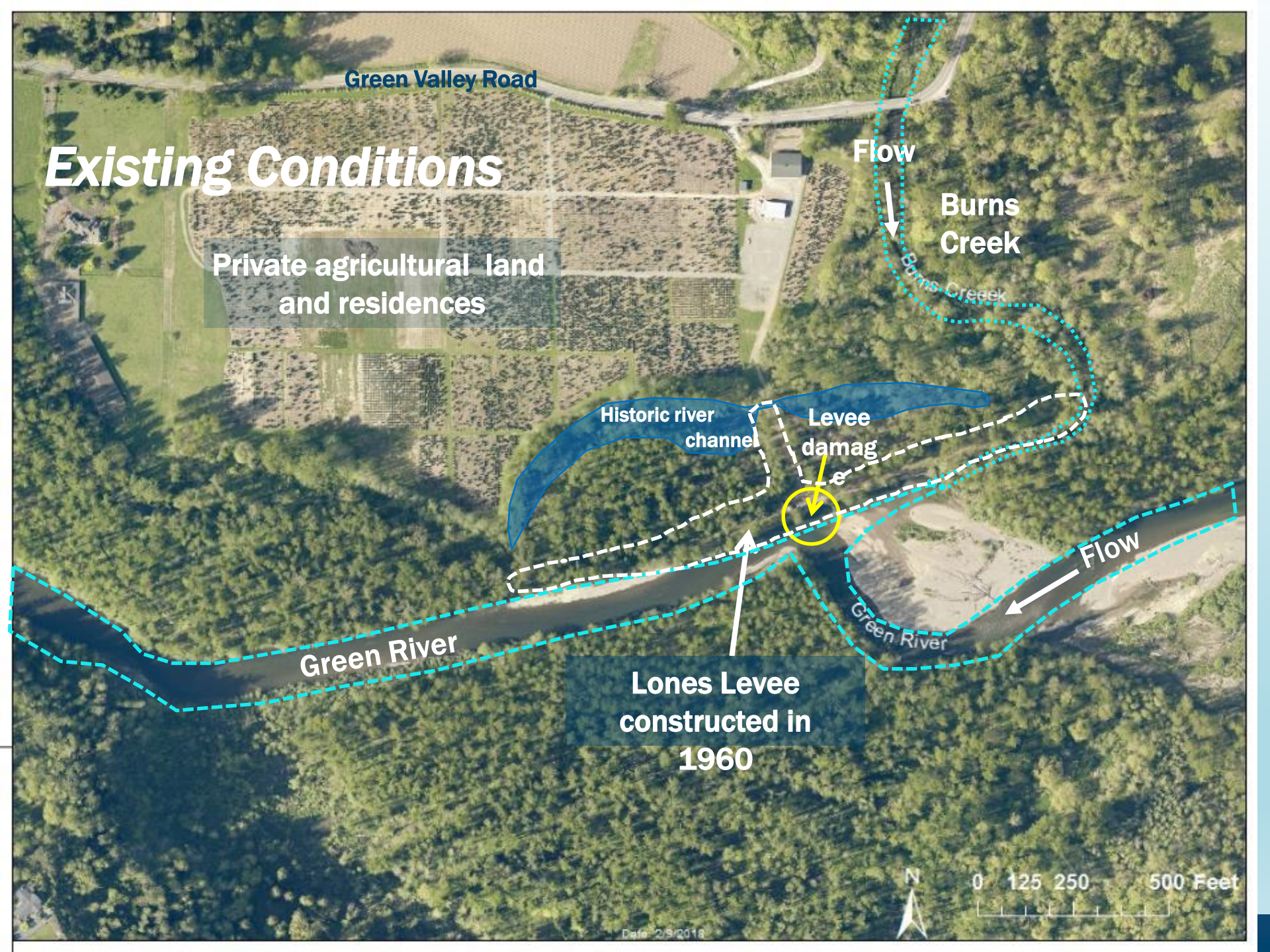
Green River

Flow



0 125 250 500 Feet

Date: 2/9/2018



Proposed Conditions

New levee
for flood protection

New rock revetment
for erosion protection

Burns
Creek

Burns Creek
relocation

Historic river
channel

Green River

Levee Removal

Flow

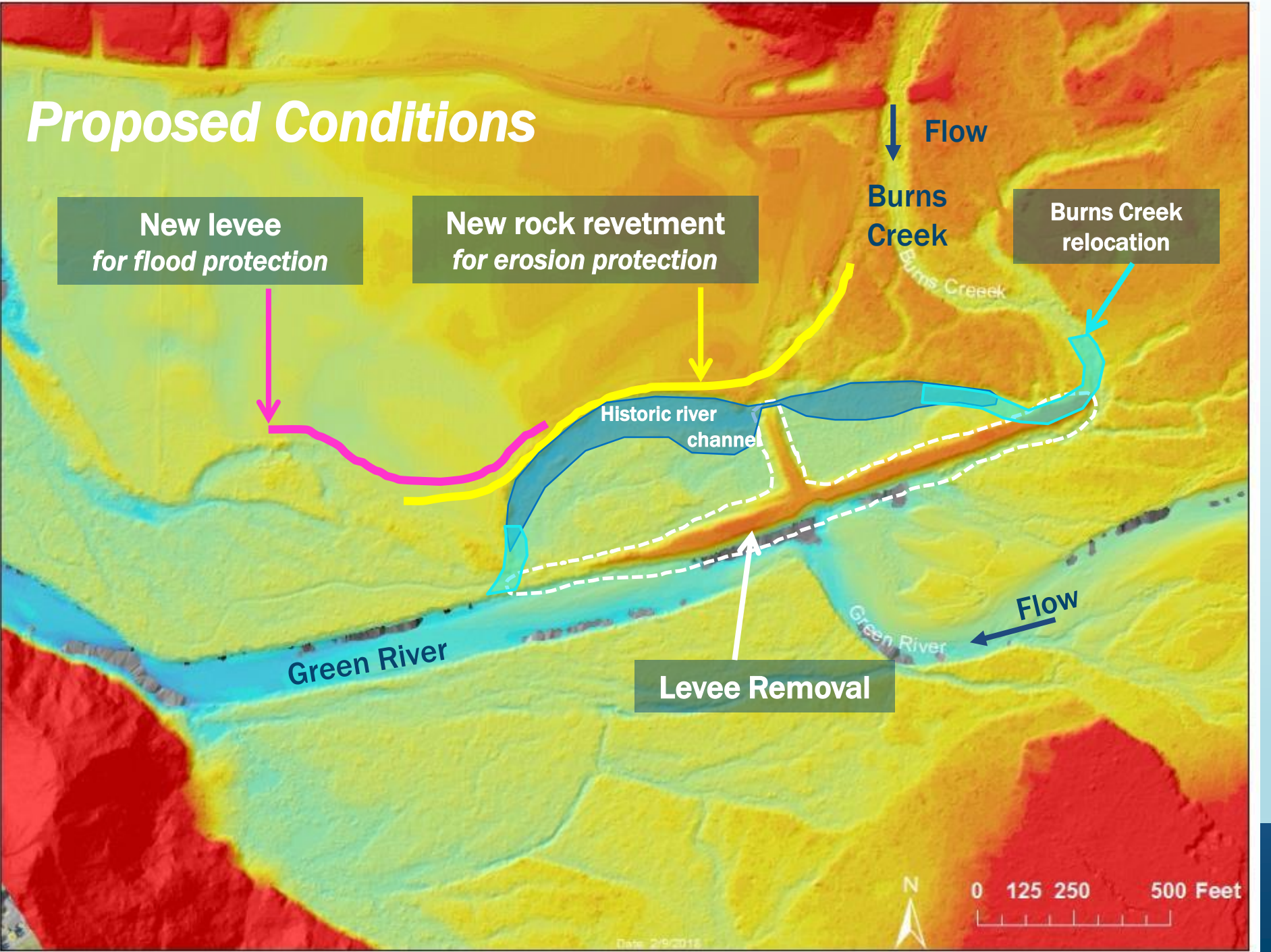
Flow

Green River



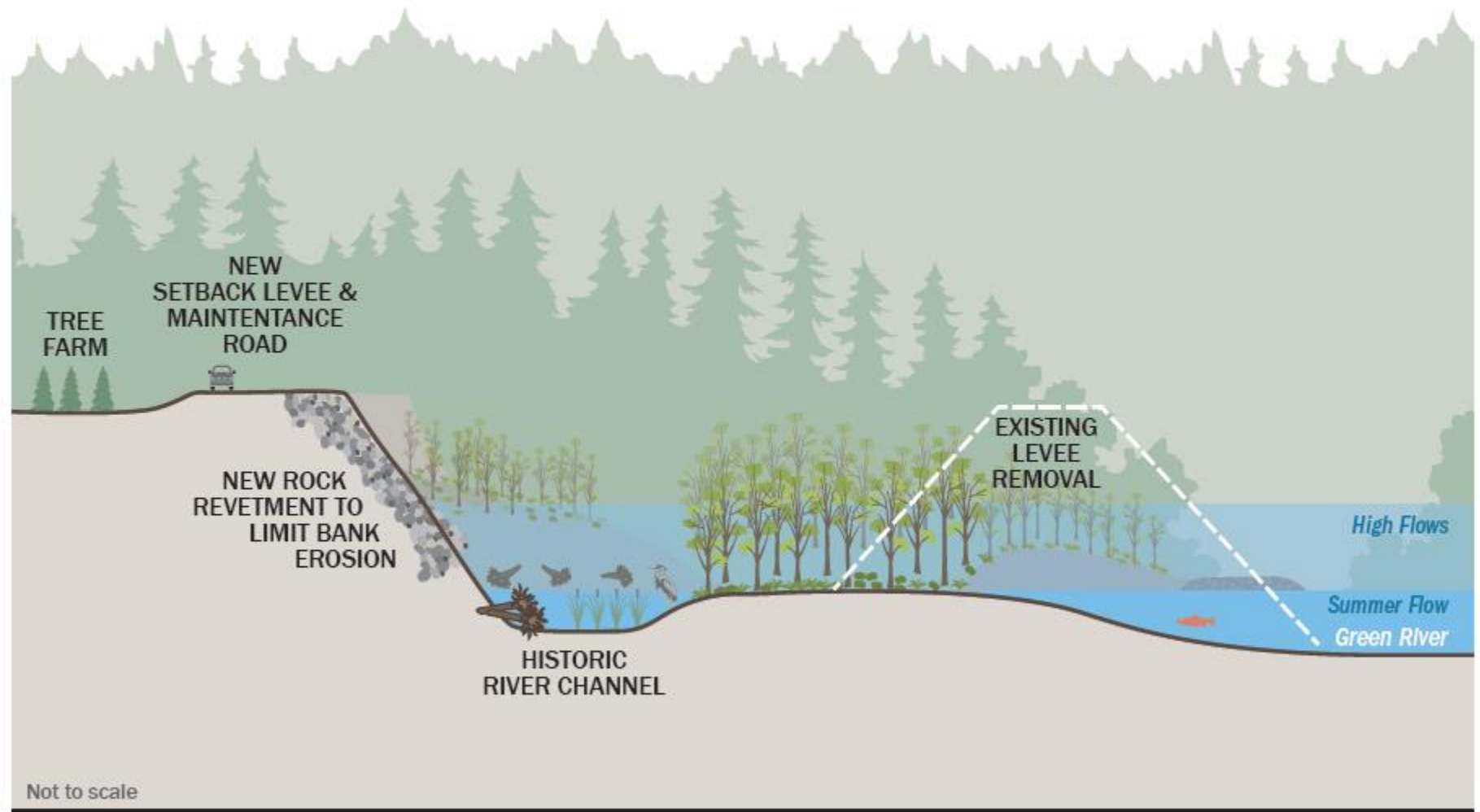
0 125 250 500 Feet

Date: 2/9/2016



LONES LEVEE: Proposed Conditions

Cross-section looking east (upriver)



1802_8805w_lones_levee.at



King County

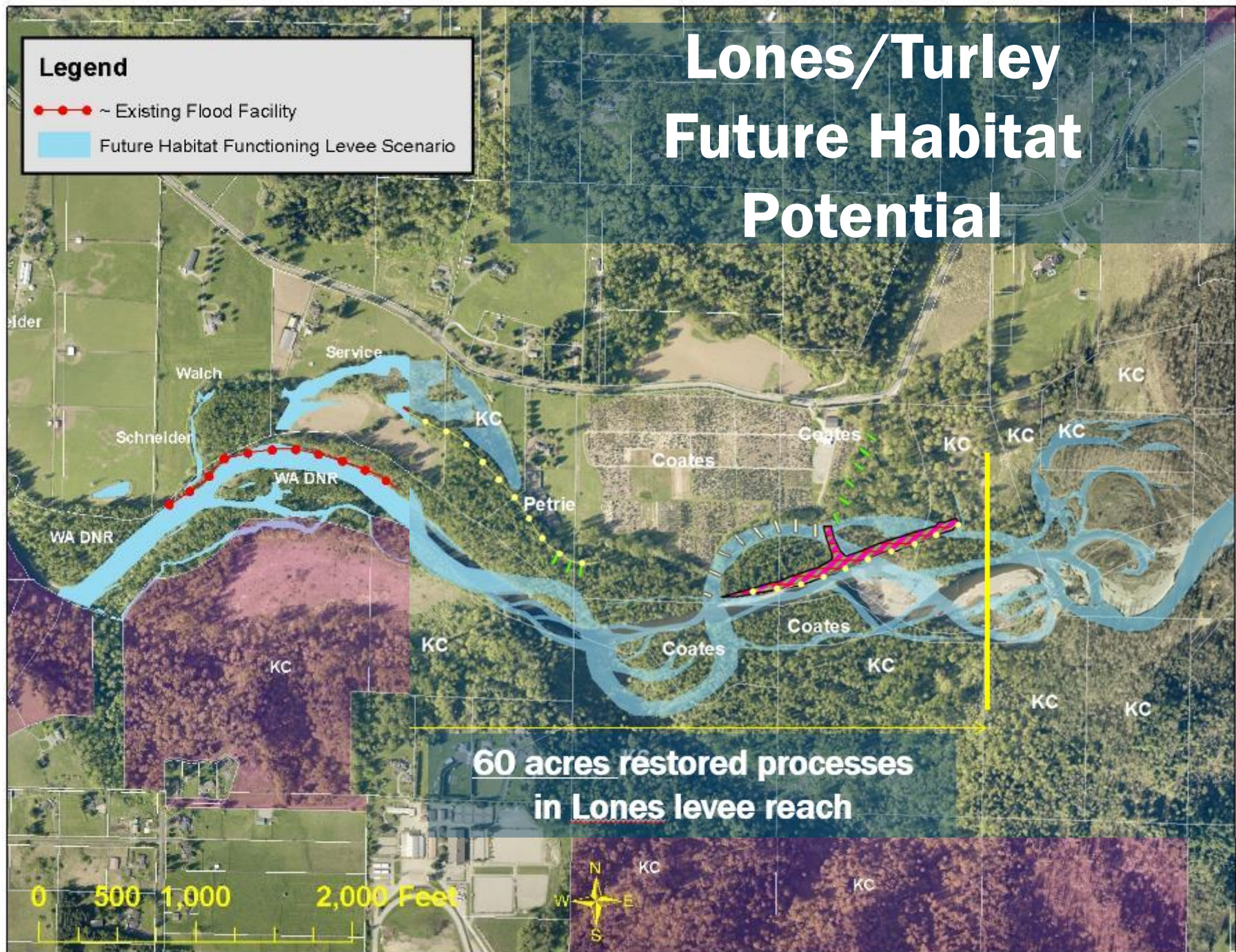
Department of Natural Resources and Parks
Water and Land Resources Division

Lones/Turley Future Habitat Potential

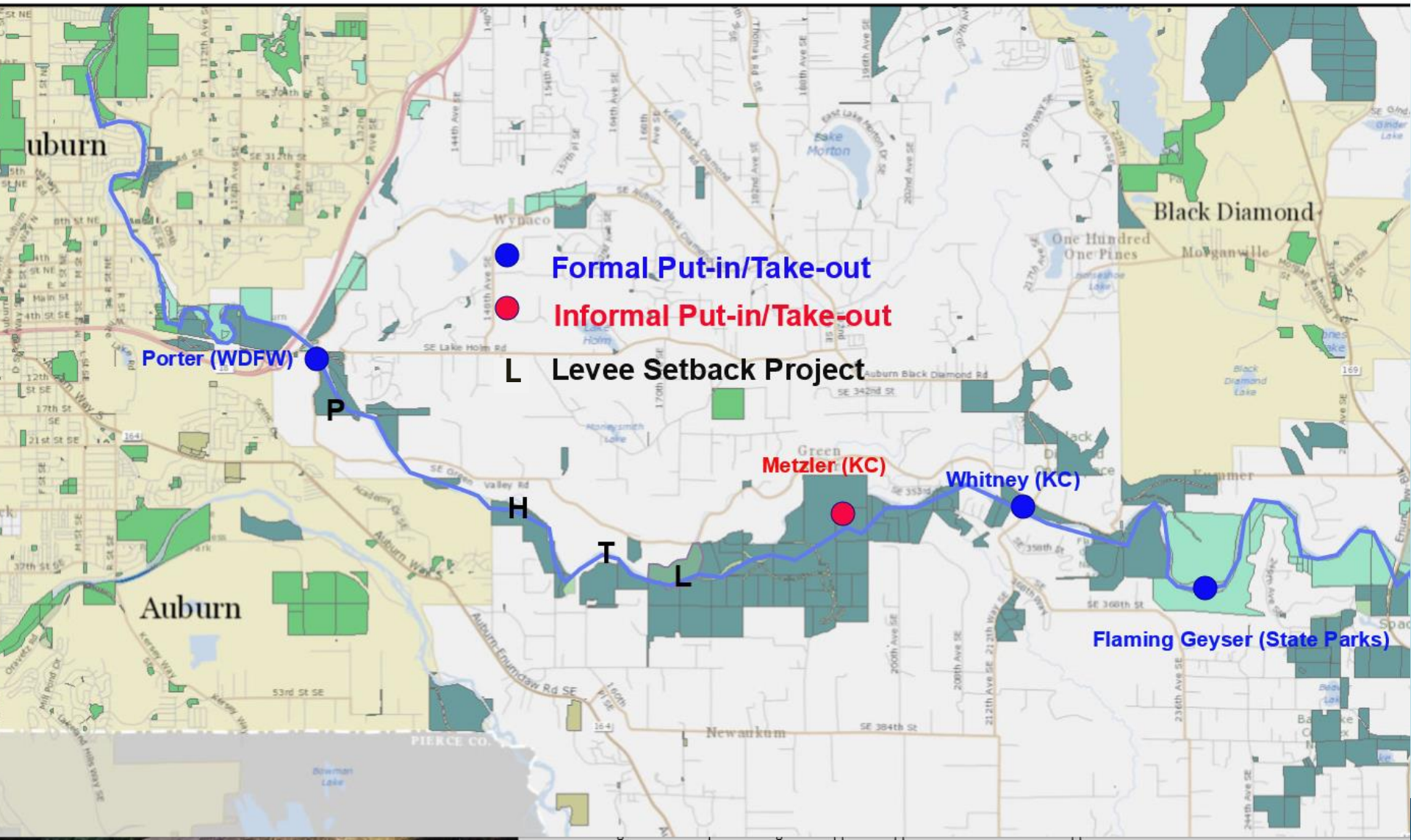
Legend

~ Existing Flood Facility

Future Habitat Functioning Levee Scenario

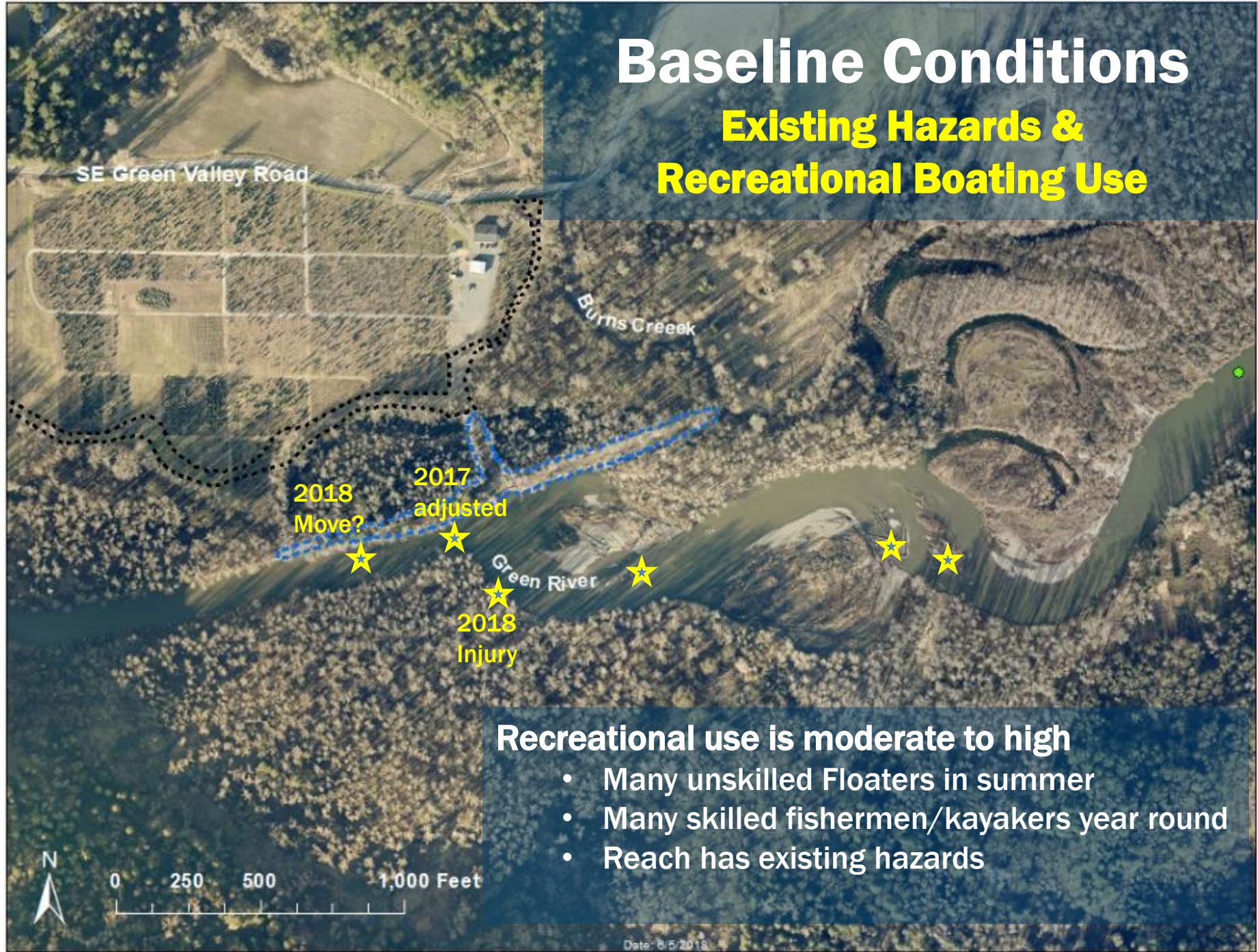


Green River Recreational Boat Access




Baseline Conditions

Existing Hazards & Recreational Boating Use



Proposed Conditions

- Hazards will continue to develop
- Design will have less influence than post-project natural processes
- KC will develop a site management plan as design evolves that will include:
 - Outreach to and input from users and resource agencies
 - Signage at boat ramps
 - Possible improvement of upstream haul-out
 - Monitoring and alerts regarding conditions
 - Use advisories especially for less experienced users



Lones Levee Setback Project

Schedule Overview

- Stakeholder outreach Ongoing
- Alternatives analysis/30% design development 2018
- **30% design plans & checklist complete 1st quarter 2019**
- 60% plans Complete August 2019
- Final Plans Complete January 2020
- Construction Summer 2020

Contact Information

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206-477-4684



King County

Riverbend Levee Setback and Floodplain Restoration

Jon Hansen, Project Manager

June 12, 2018 – Issaquah Fish Hatchery

June 13, 2018 – Riverbend Club House

Department of Natural Resources and Parks

Water and Land Resources Division

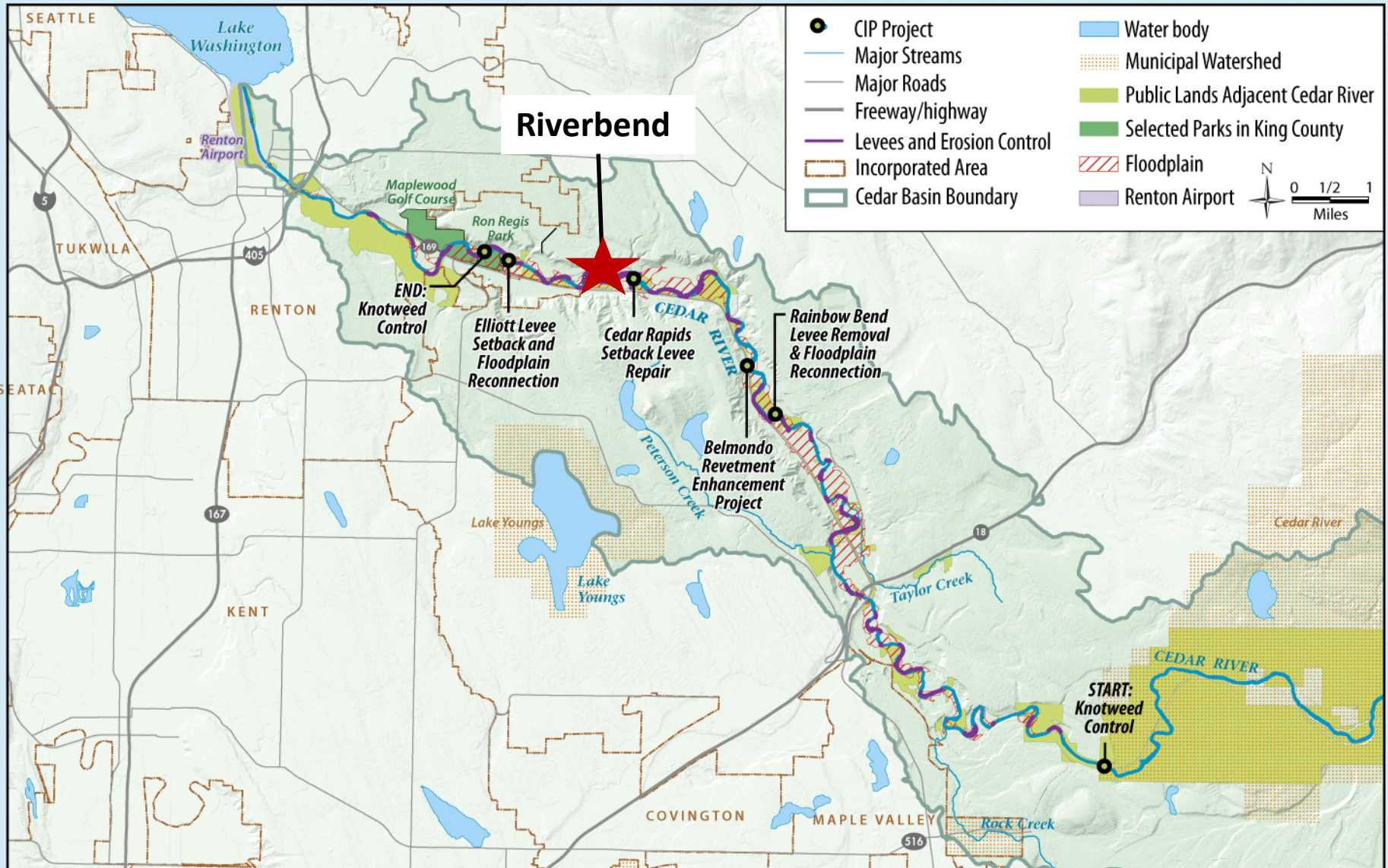
Rural and Regional Services Section

Ecological Restoration and Engineering Services Unit

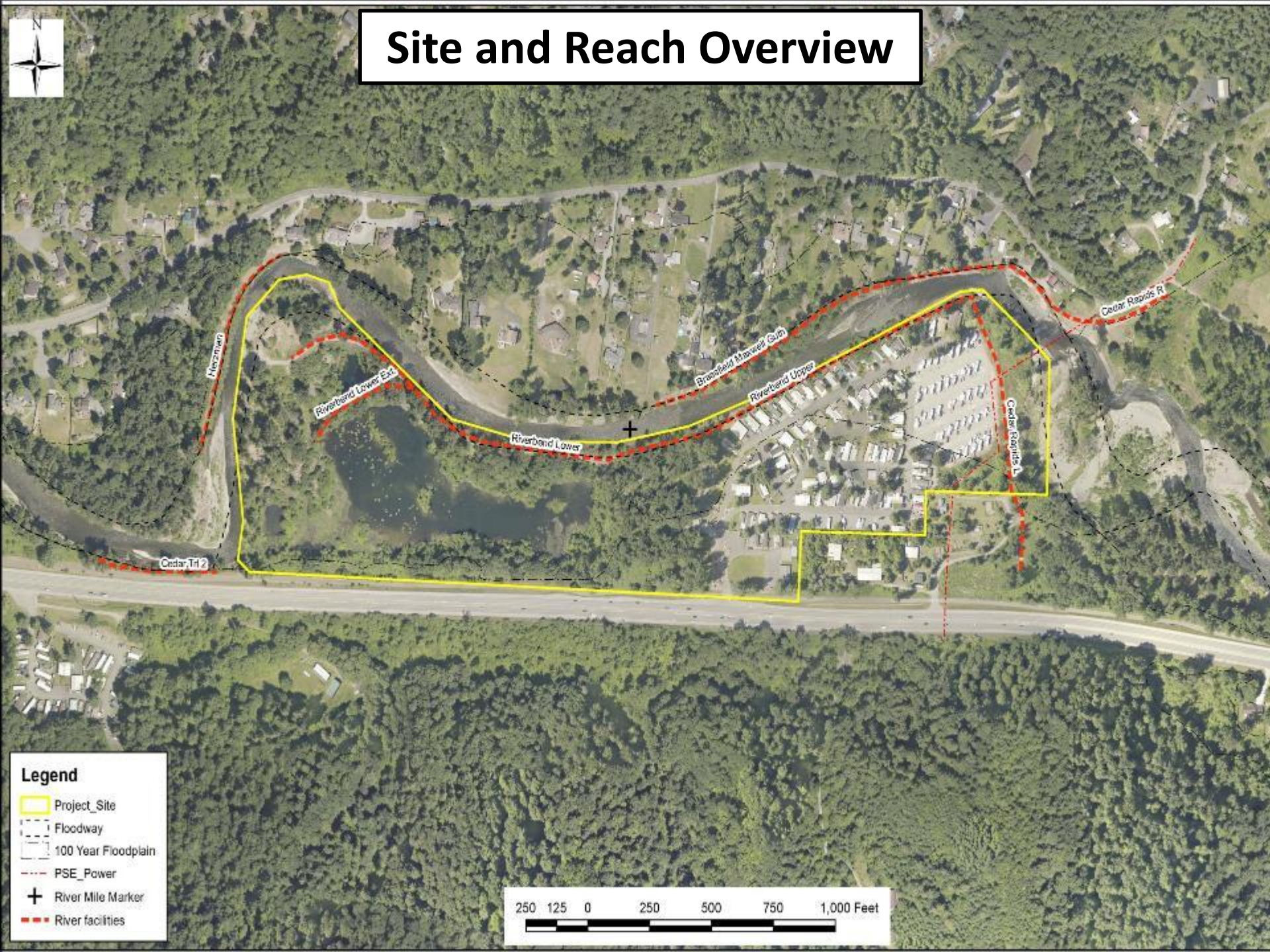


King County

Riverbend Levee Setback and Floodplain Restoration



Site and Reach Overview



Recreational Use

2013 Data

~3,700 Cedar River floaters

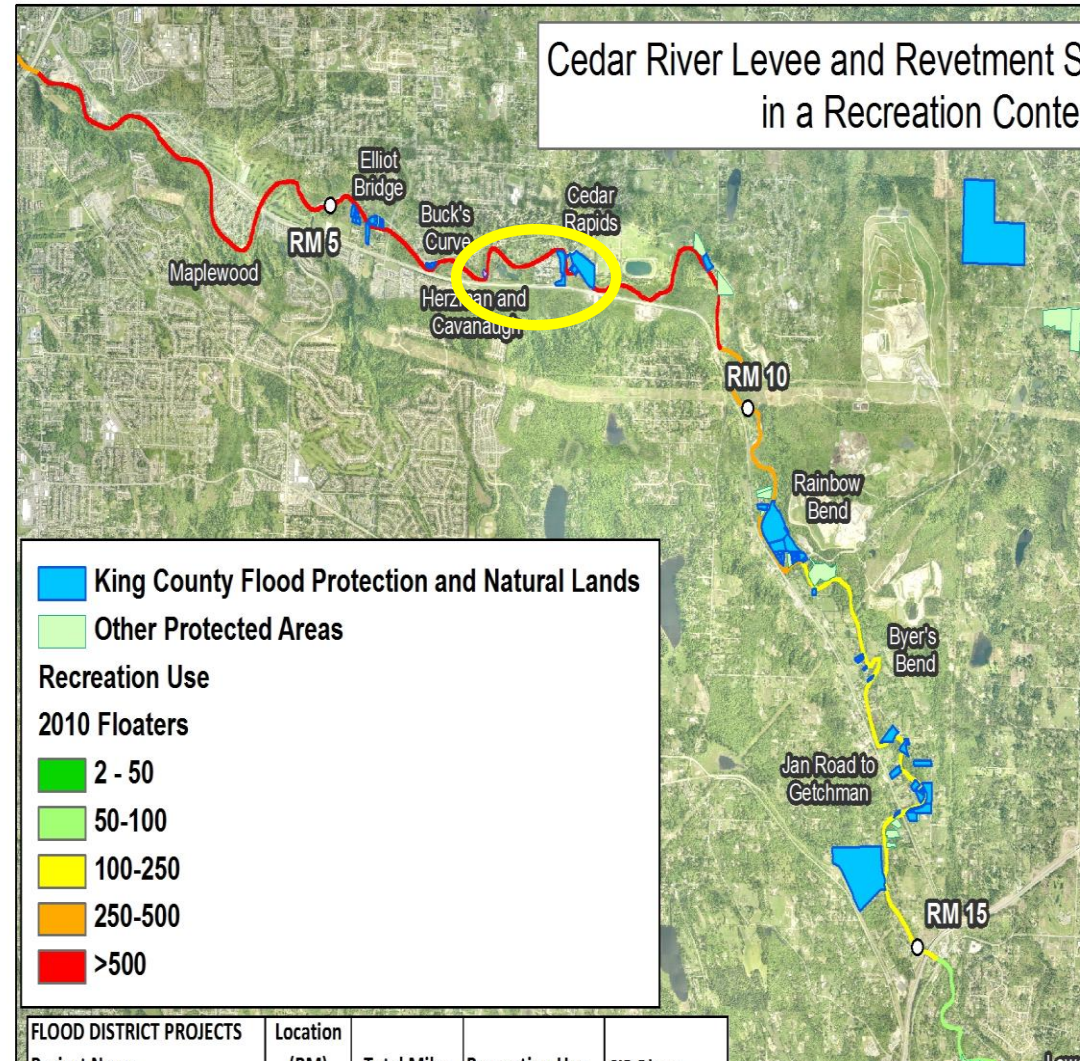
~1,900 in Ricardi Reach

78% Inner tubes

15% Rafts

5% Kayaks

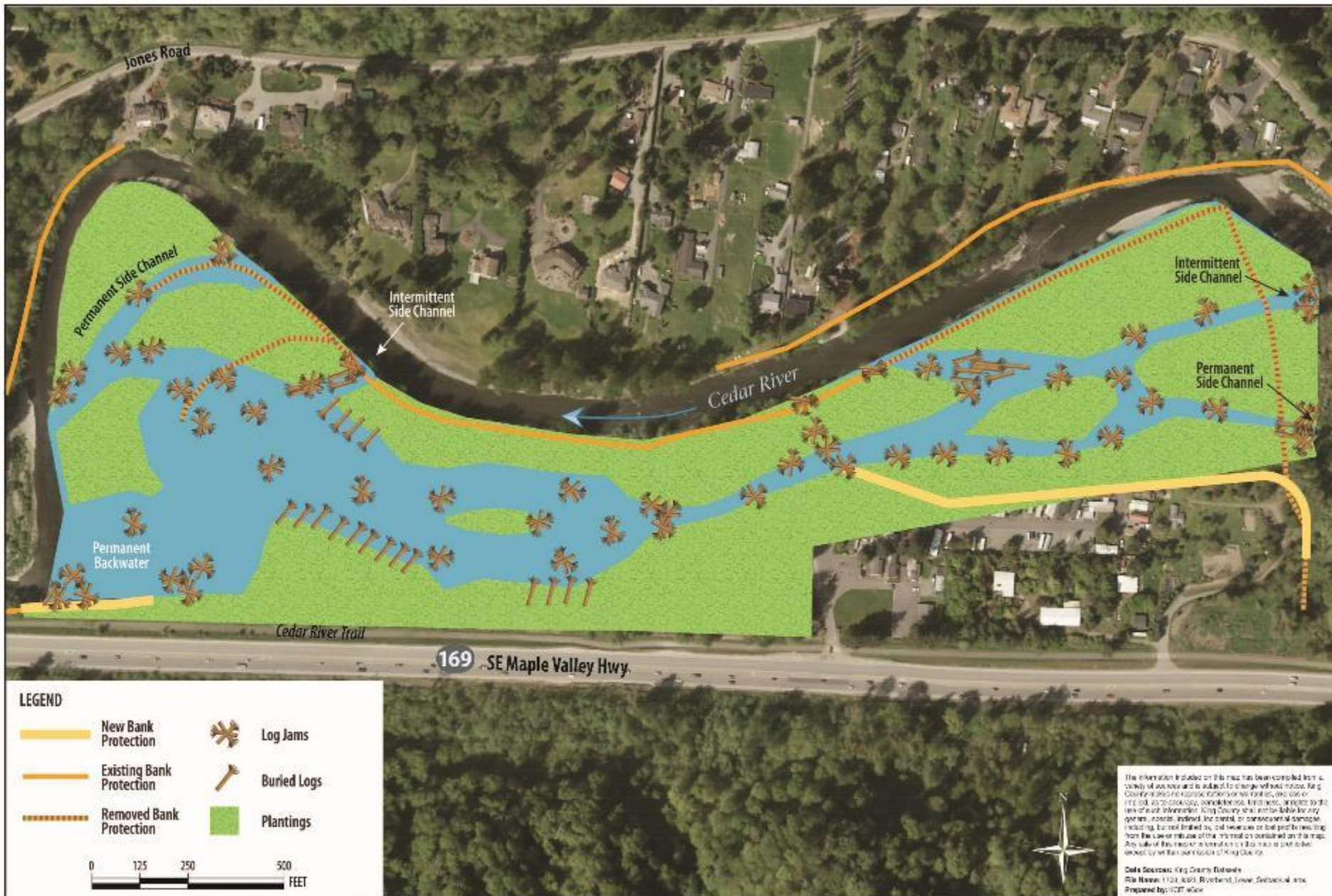
~13% Wearing Life vests



Project Goals

- *Improve quality, quantity and sustainability of salmonid spawning and rearing habitat*
- *Reduce flood and erosion risks to people, property and infrastructure*
- *Accommodate public use consistent with future ecological conditions on site*
- *Balance flood and ecological benefits and other objectives with project costs*

Preliminary Wood Placement



Large Wood Proposed

- **Current design estimate ~ 1,500 pieces**
 - 450-600 logs + 800-1000 tops, large branches, etc
 - All located in the floodplain
 - Majority placed in jams/clusters
 - Anchoring still being designed, but most stabilized with rock and soil ballast
- **In newly created channels to:**
 - Stabilize inlets and restrict/meter flow
 - Restrict channel expansion and headcutting
 - Increase complexity, roughness and provide cover and stability
- **In floodplain to increase roughness, dissipate energy and trap wood and sediment**

Schedule

- **June 2015 – Project Initiation**
- **2015 -2016 – Data Collection and Analysis**
- **Preliminary design - Complete**
 - **Large Wood Checklist ~ late June 2018**
- **December 2018 – Final Plan complete**
- **Summer 2019/2020 – construction target**

Contact Information

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206-477-4706

Project webpage:

www.kingcounty.gov/services/environment/animals-and-plants/restoration-projects/riverbend-levee-setback.aspx



King County